



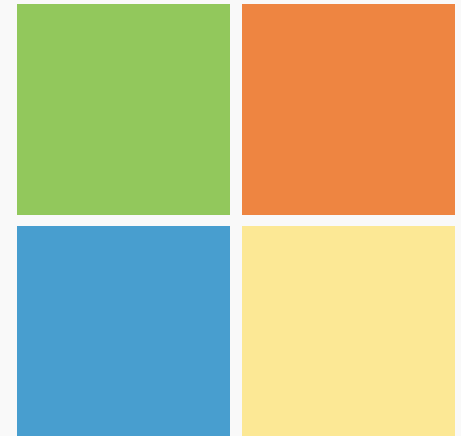
# Project M<sup>3</sup> and Project M<sup>2</sup>

## Effective Curriculum for Developing Mathematical Talent



Kathy Gavin

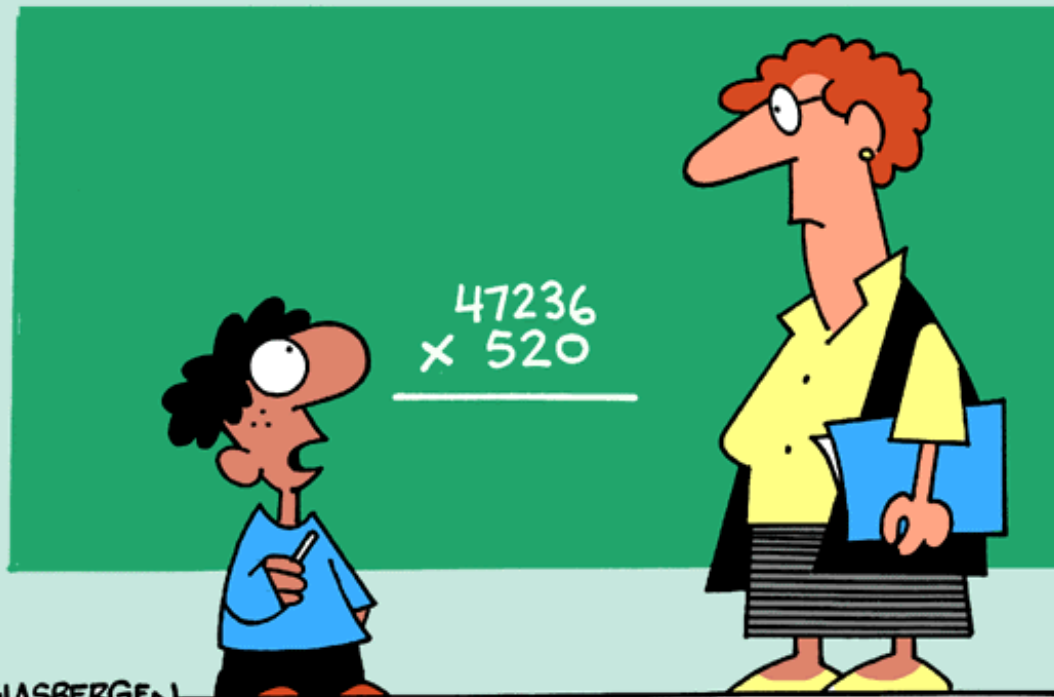
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# Math Curriculum For Talented Students

## What it is not about...

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"AREN'T THERE ENOUGH PROBLEMS IN THE WORLD ALREADY?"

# Math Curriculum For Talented Students

## What it IS about...

- ▣ **New advanced content**
  - Developed with focus, coherence and rigor
- ▣ **Critical thinking**
  - Think deeply about content
  - Persist in problem solving
  - Create viable arguments
  - Defend reasoning and critique reasoning of others
- ▣ **Creative thinking**
  - Pose original problems and/or solutions to problems



# Project M<sup>3</sup> Curriculum Units

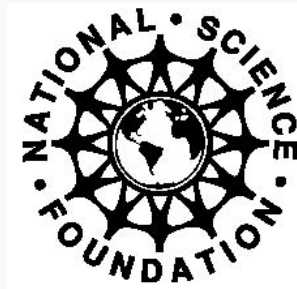
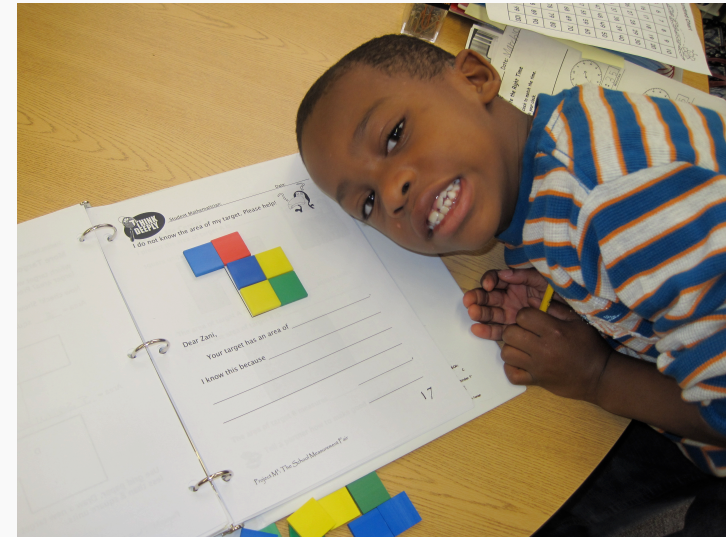


- 6-year Javits curriculum project
- 15 advanced math units
- Levels 3-4, 4-5, and 5-6
- Research-Based Content
  - Number, Operations, Proportional Reasoning
  - Algebra
  - Geometry and Measurement
  - Data, Probability and Statistics



# Project M<sup>2</sup> Curriculum Units

- 6-year NSF curriculum project
- 8 advanced units
- Grades K-2
- Research-based Content
  - ▣ Number
  - ▣ Geometry
  - ▣ Measurement



# Projects M<sup>3</sup> and M<sup>2</sup>

## Exemplary Gifted Education Practices

- Focus on big ideas
- Add depth and complexity
- Engage students to think and act like mathematicians
- Incorporate projects and investigations
- Focus on student engagement and love of learning



- National Association for Gifted Children
- Multiple Distinguished Curriculum Awards  
(2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012)
- Project M<sup>3</sup> Research Paper of the Year for Gifted Education 2009



# Research Publications



- ❑ Casa, T. M., Firmender, J. M., Gavin, M. K., & Carroll, S. R. (2017). The influence of challenging geometry and measurement units on the mathematics achievement of kindergarteners. *Gifted Child Quarterly*, 61(1), 52-72.
- ❑ Gavin, M. K., Casa, T. M., Adelson, J. L., & Firmender, J. M. (2013). The Impact of advanced geometry and measurement units on the achievement of grade 2 students. *Journal for Research in Mathematics Education*, 44(3), 478-510.
- ❑ Gavin, M. K., Casa, T. M., Firmender, J. M., & Carroll, S. R. (2013). The Impact of advanced geometry and measurement units on the mathematics achievement of first-grade students. *Gifted Child Quarterly*, 57(2), 71-84. *Journal for Research in Mathematics Education* (2013)
- ❑ Gavin, M. K., Casa, T. M., Adelson, J. L., Carroll, S. R., & Sheffield, L. J. (2009). The impact of advanced curriculum on the achievement of mathematically promising elementary students. *Gifted Child Quarterly*, 53(3), 188-202.
- ❑ Gavin, M. K., Casa, T. M., Adelson, J. L., Carroll, S. R., Sheffield, L. J., & Spinelli, A. M. (2007). Project M<sup>3</sup>: Mentoring Mathematical Minds: A research-based curriculum for talented elementary students. *Journal of Advanced Academics*, 18 (4), 566-585.



# Research Results

## Project M<sup>3</sup> Students

**For EVERY grade level (3, 4, and 5) for two cohorts:**

- Consistent significant gains on all units and standardized tests (ITBS math) for all groups
- Consistent significant gains over a comparison group at all grade levels on standardized and open-response assessments based on above-grade TIMSS and NAEP questions.



# Research Results

## Project M<sup>2</sup> Students

**For EVERY grade level (K, 1 and 2):**

- Consistent significant gains on all units for all grades
- Consistent significant gains over a comparison group of like students at all grade levels on open-response assessments with large effect sizes.



# Our Teachers

- New ways to teach
- Significant gains in math knowledge  
( $p < .05$ )
- Greatly increased expectations for students



# For More Information

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[www.projectm3.org](http://www.projectm3.org)

[www.projectm2.org](http://www.projectm2.org)

Welcome to Project M<sup>3</sup>



**PROJECT M<sup>3</sup>: Mentoring Mathematical Minds**

Project M<sup>3</sup> Units are published by Kendall Hunt Publishing. Visit [Kendall Hunt](#) to order your Teacher Guide, Student Mathematician's Journals, and Hint and Think Beyond Cards.

A national curriculum research project funded by the U.S. Department of Education Javits Gifted and Talented Students Education Act to nurture mathematical talent in elementary students.



**Winner of the National Association for Gifted Children Distinguished Curriculum Studies Awards**

- Unraveling the Mystery of the Moil Stone: Place Value and Numeration (2004)
- What's the ME in MEasurement All About? (2005)
- At the Mall with Algebra: Working with Variables and Equations (2006)
- What Are Your Chances? (2007)
- Record Makers and Breakers: Using Algebra to Analyze Change (2008)
- Getting Into Shapes (2009)

For additional background information read [Meeting the Needs of Talented Elementary Math Students](#).

ABOUT PROJECT M<sup>3</sup>  
FOR TEACHERS  
FOR STUDENTS  
FOR PARENTS

Project M<sup>2</sup>—Mentoring Young Mathematicians (2007-2013)



Welcome to Project M<sup>2</sup>  
An advanced mathematics curriculum and research study for primary level students funded by the [National Science Foundation](#) and conducted at the [Heag School of Education](#) of the University of Connecticut.

Through Project M<sup>2</sup> the following goals were accomplished:

- Created and published six advanced mathematics units for students in Grades K, 1, & 2;
- Developed students' understanding of geometry and measurement content and processes;
- Supported young students' real-world experiences in mathematics;
- Increased the mathematics achievement of all students in grades K-2;
- Targeted the participation of traditionally underrepresented students in advanced mathematics curriculum, including minorities, those from low SES backgrounds, and second language learners.

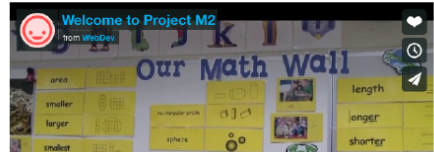
Students and teachers in 11 schools of varying socioeconomic levels in Connecticut, Kentucky, South Carolina, and Texas participated in Project M<sup>2</sup> over a 5-year period.

**Awards**

**NAGC Distinguished Curriculum Award**

- 2010 Level 2 *Designing a Shape Gallery: Geometry with the Meerkats*
- 2011 Level 1 *Exploring Shape Games: Geometry with Ima and Zani*
- 2012 Level K *Exploring Shapes in Space: Geometry with the Frogonauts*

Project M<sup>2</sup> Units are published by Kendall Hunt Publishing. Visit [Kendall Hunt](#) to order your Manipulative Kit, Teacher Guides, Teacher Resources, and Student Mathematician Journals.



[www.kendallhunt.com](http://www.kendallhunt.com)