

*center for*



**G**ifted

**STUDIES**

**T**alent

**DEVELOPMENT.....**

BALL STATE UNIVERSITY



# Building Math Talent at the Middle and Secondary Levels

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Toni Hillman, **Westfield-Washington Schools**  
Katy Debbink, **Burriss Lab School**

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IAG/IDOE Conference  
Indianapolis, Indiana



# Project CEM<sup>2</sup>

## Cataloging Exceptional Math Materials

### ○ Phase I

#### ● Develop Rubric

- To identify & rate material that could be used for acceleration and/or enrichment in elementary grades, K-5

### ○ Phase II

#### ● Review Materials

- Shared Information Services (SIS)
- Matched to Standards



# Development of the Rubric

## o Resources

- *Jane and Johnny Love Math*, A.E. Lupowski & S.G. Assouline
- *Developing Mathematical Talent*, S.G. Assouline & A.E. Lupowski-Shoplik
- *Developing Mathematical Promise*, L.J. Sheffield
- *Teaching and Learning Mathematics*, L.J. Sheffield & D.E. Cruikshank
- *The Essentials of Mathematics K-12*, K. Checkley
- *Mathematics for Elementary Teachers*, A.B. Bennett, Jr. & L.T. Nelson
- *Mathematics Program Improvement Review*, R. Pelfrey
- *Math Education for Gifted Students*, S.K. Johnsen & J. Kendrick



# Development of the Rubric

## o Resources

- The California Department of Education
  - <http://www.cde.ca.gov/ci/ma/im/documents/math98criteria.pdf>
- The College of William & Mary  
Center for Gifted Education Website
  - Resource Guide to Mathematics Curriculum Materials
  - Math Curriculum Extensions
- Classroom Practice



# Development of the Rubric

## ○ Criteria

- Curriculum Issues
- Gifted and Talented
- Teacher Features
- Student Functions
- Questions

## ○ Who

- All Students
- GT Students



# Development of the Rubric

## ○ Refined - Weighted

- Features for High Ability Students (40)
- Features of Exemplary Mathematics Curriculum (32)
- Key Teacher Features (24)

## ○ Added

- Demographics
- WOW Factor – Scale 0 to 4
- NCTM Standards
  - Content
  - Process

## Criteria for Rating Exemplary Math Materials for High Ability Students

### Key Features for High Ability Students

Criteria	Not Present 0	Minimally Present 1	Below Average 2	Average 3	Above Average 4	Exemplary 5	Score
Encourages mathematical reasoning							
Self-paced advancement to higher levels							
Emphasis on higher order thinking skills (analysis, synthesis, evaluation)							
Use of open-ended and advanced strategies							
Real world problem applications							
Allow children to demonstrate abilities in a variety of ways							
Multi-step problem solving							
Fosters holistic and lateral solutions							
						Total (0-40)	

### Key Features of Exemplary Mathematics Curriculum

Criteria	Not Present 0	Below Average 1	Average 2	Above Average 3	Exemplary 4	Score
Coherent, focused, articulate explanations						
Integrated assessment in teaching and learning process						
Encourages mathematical communication skills						
Discovery orientation, exploration of concepts						
Challenging activities and/or extensions that focus on problem solving						
Nature of tasks allows flexibility						
Problems foster high level thinking						
Tasks allow children to build on previous knowledge and make new knowledge						
					Total (0-32)	



### Key Teacher Features

Criteria	Not Present 0	Adequate 1	Above Average 2	Exemplary 3	Score
Integrates math into other subject areas					
Gives examples of completely solved problems					
Differentiated instruction ideas included					
Full, adult-level explanations of mathematical concepts					
Instructional strategies/suggestions provided					
Practice problems included					
Manipulative use					
Makes full, appropriate use of technology					
				<b>Total (0-24)</b>	

**WOW Factor (Additional points for extras that aren't accounted for elsewhere)**

**Total (1-4)** \_\_\_\_\_

**Explain why:**

**Sum the three totals and the wow points for a grand total:**

**Grand Total: (0-100)** \_\_\_\_\_

**Please check the NCTM Standards for School Mathematics addressed in this material:**

Number and Operations Standard		Problem Solving Standard	
Algebra Standard		Reasoning and Proof Standard	
Geometry Standard		Communication Standard	
Measurement Standard		Connections Standard	
Data Analysis and Probability Standard		Representation Standard	

# Microsoft Access Software

Title

Author(s)

Publisher

Date of Publication

ISBN Number

Type of Material

Suggested age or grade or grade band

Rater

Date

## Key Teacher Features

Integrates math into other subject areas

Gives examples of completely solved problems

Differentiated instruction ideas included

Full, adult-level explanations of mathematical concepts

Instructional strategies/suggestions provided

Practice problems included

Manipulative use

Makes full, appropriate use of technology

Total 0-24

WOW Factor 1-4

Explain why:

Sum the three totals and the wow points for a grand total: 0-100

## Key Features for High Ability Students

Encourages mathematical reasoning

Self-paced advancement to higher levels

Emphasis on higher order thinking skills

Use of open-ended and advanced strategies

Real world problem applications

Allow children to demonstrate abilities in a variety of ways

Multi-step problem solving

Fosters holistic and lateral solutions

Total 0-40

## Please check the NCTM Standards for School Mathematics addressed in this material:

Number and Operations Standard

Algebra Standard

Geometry Standard

Measurement Standard

Data Analysis and Probability Standard

Problem Solving Standard

Reasoning and Proof Standard

Communication Standard

Connections Standard

Representation Standard

## Key Features of Exemplary Mathematics Curriculum

Coherent, focused, articulate explanations

Integrated assessment in teaching and learning process

Encourages mathematical communication skills

Discovery orientation, exploration of concepts

Challenging activities that focus on problem solving

Nature of tasks allows flexibility

Problems foster high level thinking

Tasks allow children to build on previous knowledge and make new knowledge

Total 0-32

Comments after rating

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<b>Total 0-24</b>	<input type="text" value="0"/>

WOW Factor 1-4

Explain why:

Sum the three totals and the wow points for a grand total: 0-100

## Key Features for High Ability Students

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Real world problem applications	<input type="text" value="0"/>
Allow children to demonstrate abilities in a variety of ways	<input type="text" value="0"/>
Multi-step problem solving	<input type="text" value="0"/>
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## Key Features of Exemplary Mathematics Curriculum

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Comments after rating



# Examples

The good, the bad, & the UGLY!



# Statistics

- Identified 300 Books/64 Kits in SIS
- To Date 339 Items Evaluated
  - Highest **91**
  - Lowest **6**
  
  - 45 Scored 75 or Above
  - 159 Scored 50 or Below





# Statistics

- To Date 339\* Books Evaluated
  - **Wow Factor**

Score	Number
0	202
1	70
2	50
3	13
4	3

\*One was not counted due to a faulty score



# Statistics

- Content Standards

● Number & Operations	264
● Algebra	150
● Geometry	171
● Measurement	154
● Data Analysis & Probability	152



# Statistics

## o Process Standards

- Problem Solving 256
- Reasoning & Proof 144
- Communication 197
- Connections 147
- Representation 195



# Project CEM<sup>2</sup>

## Cataloging Exceptional Math Materials

- Phase III
  - Provide Guide of Identified Materials
  - Regional Workshops
- Additional Ideas
  - Rate Materials not Available from SIS
- Timeline
  - Available Soon
  - Updated Periodically
  - Searchable on the BSU Center for Gifted Studies Website

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