Closing Math Learning Gaps With Data & Formative Assessment

Presenter:
Kristine Tipton, Innovation Coach
DeKalb County Central United School District (Indiana)
Poll

What are your challenges within K-8 math?

- Engaging students
- Test scores
- Differentiating instruction
- Personalizing learning
- Teacher willingness to change
- Informing instruction
Poll

What strategies are you currently using in your math classroom?

- Project-based
- Blended Learning
- Technology
- Teacher focused
- Student stations
- Paper manipulatives
- Digital math program implemented
- Formative assessment
Maximizing Student Learning

Math makes me persπre!

OR

\[\sqrt{-1} \ 2^3 \ \sum \ \pi\]

And it was delicious!

...and everything in between.
Creating a math model that...

Kid Snippet

- Uses data to drive instruction.
- Provides opportunities to apply their learning in a variety of ways.
Golden Circle: Why is it important to reach my kids in math?

Simon Sinek

Start here.
What is our why?

We strive to close mathematical gaps in student learning.

We do this by utilizing NWEA strand work and DreamBox reports to isolate skill gaps. A workshop model is then used in the classroom to target the indicated gaps or growth areas.
What Are Quadrilaterals?
Draw It

Circle all the parallelograms.
Categorical Property

Groups of: 3 groups of 5

3 × 5 = 15

An Array

Repeated Addition

3 + 3 + 3 + 3 + 3 = 15
MATH COMPONENTS

Mini Lesson
- Interactive
- Anchor Charts

Technology Opportunities
- Exposure to practice in multiple ways

Small Groups
- Fluid
- Data driven

Problem Solving
- Real world applications
- Higher level thinking
- Written expression

Vocabulary
- Content specific
  - Higher level thinking
# Classroom Summary Report

**DreamBox Learning Curriculum**

**School:**

**Class:**

**Teachers:**

**Date:** Oct 27, 2015

<table>
<thead>
<tr>
<th>Student</th>
<th>Grade</th>
<th>1st Grade Curriculum</th>
<th>2nd Grade Curriculum</th>
<th>3rd Grade Curriculum</th>
<th>4th Grade Curriculum</th>
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</tbody>
</table>

**Symbol Legend**

- Skipped based on initial placement
- Passed in unit pretest
- Completed curriculum
- Pending assessment

- Needs assistance
- Working inefficiently
### Detailed Student Summary Report

#### Curriculum Category Completion

<table>
<thead>
<tr>
<th>Curriculum Category</th>
<th>1st Grade</th>
<th>2nd Grade</th>
<th>3rd Grade</th>
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</tbody>
</table>

**Key**:
- Skipped based on initial placement
- Passed in unit pretest
- Completed curriculum
- Pending assessment

#### What’s learning now?

- is developing an understanding of place value to 10,000 by grouping numbers in thousands, hundreds, tens, and ones. By the end of these lessons, he is comfortable making equivalent arrangements for whole numbers.
The image shows a screenshot of a dashboard interface for a learning management system. The dashboard displays data for students across different grades, including their class time (Min/Wk), extended use (Extended Use), lessons per week (Lessons/Wk), and growth percentage (Growth). The data includes:

- Grade 4:
  - 48 min, 0% extended use, 5.0 Lessons/Wk, 2% growth
  - 0 min, 0% extended use, 0.0 Lessons/Wk, 0% growth
  - 35 min, 0% extended use, 0.0 Lessons/Wk, 0% growth
  - 59 min, 0% extended use, 17.0 Lessons/Wk, 5% growth
  - 100 min, 0% extended use, 4.0 Lessons/Wk, 3% growth
  - 156 min, 0% extended use, 24.0 Lessons/Wk, 12% growth
  - 99 min, 0% extended use, 17.0 Lessons/Wk, 9% growth
  - 42 min, 0% extended use, 1.0 Lessons/Wk, 0% growth
  - 55 min, 0% extended use, 3.0 Lessons/Wk, 2% growth
  - 82 min, 0% extended use, 7.0 Lessons/Wk, 2% growth
  - 62 min, 0% extended use, 6.0 Lessons/Wk, 4% growth
  - 130 min, 0% extended use, 31.0 Lessons/Wk, 17% growth
  - 126 min, 0% extended use, 8.0 Lessons/Wk, 4% growth
  - 51 min, 0% extended use, 8.0 Lessons/Wk, 4% growth
  - 50 min, 0% extended use, 2.0 Lessons/Wk, 0% growth

The total number of students is 2,041 with 18% growth since July 1, 2015.
Under “Resources”-Teacher Tools you have:

- Access to the games to teach students how to play
- Sample lesson plans
### Classroom Resources

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Activity</th>
<th>Standards</th>
<th>Usage</th>
</tr>
</thead>
</table>

#### Lesson: Needs Congratulations

- **Waterloo**
- Grade 4 Classroom

- **1,433** Lessons completed since July 1, 2015
- **23%** Percent Growth since July 1, 2015

- **Lesson In Progress:** Partial Products using Arrays
  - Students build arrays and use partial products to "cover" a rectangular area model of multiplication up to 12x12.
  - **View Progress**

- **Lesson In Progress:** Identifying Missing Tens
  - Students identify the difference between two addends when that difference is a multiple of ten.
  - **View Progress**

- **Lesson In Progress:** Multiplication & Division Situations
  - Students use various tools and groupings to develop an understanding of multiplication and division.
  - **View Progress**

---

**Classroom Internet Address**
https://play.dreambox.com/login/sz5f/waterloo

Save this URL to your student desktops.
MATH COMPONENTS

Mini Lesson
- Interactive
- Anchor Charts

Technology Opportunities
- Exposure to practice in multiple ways

Small Groups
- Fluid
- Data driven

Problem Solving
- Real world applications
- Higher level thinking
- Written expression

Vocabulary
- Content specific
- Higher level thinking
**Mathematics**

The following table identifies the mathematics usage assessment vocabulary at each RIT score range:

<table>
<thead>
<tr>
<th>RIT SCORE RANGE</th>
<th>MATHEMATICS VOCABULARY</th>
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<tbody>
<tr>
<td>151-160</td>
<td>size</td>
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<tr>
<td>161-170</td>
<td>corner, dollar</td>
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<tr>
<td></td>
<td>flat, longest</td>
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<tr>
<td></td>
<td>shortest, table</td>
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<tr>
<td>171-180</td>
<td>before, between</td>
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<tr>
<td></td>
<td>dollar sign, fact family</td>
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<td>fewer, geometric figure</td>
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<td>hundred, largest, less</td>
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<td>metric, morning</td>
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<td>ray, seventh, similar</td>
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<td>smallest, taller</td>
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<td></td>
<td>thousand</td>
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<td>181-190</td>
<td>changed, clock, clockwise</td>
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<tr>
<td></td>
<td>closest, consecutive, cup</td>
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<tr>
<td></td>
<td>digit, estimation, even number, flip, fourth</td>
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<tr>
<td></td>
<td>left, line of symmetry, lowest, measurement, millimeter, million, most likely, most often, nearest, noon, o’clock, rod, rotation, round, row, symmetrical, symmetry, tablespoon, teaspoon, ten, ten thousand, third</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>
Dr. Robert Marzano’s research explains the concept of 4-14-40. The highest-achieving students can learn a new term with as few as 4 exposures to it. The average student needs to work with a word up to 14 times in order to master it. And your most struggling learners need as many as 40 different opportunities to work with a single word to finally learn it.

See more at: http://www.smekenseducation.com/developing-core-vocabulary-for-each-academic-area.html#sthash.X3quFjRr.dpuf
MATH COMPONENTS

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Vocabulary
- Content specific
- Higher level thinking
Writing about Math...

Be an A.C.E.!

A: Include the answer

C: "See" my work

E: Explain your thinking

Sample question:
Mary could jump 42 times each minute. How many times could she jump in two hours?

Workspace: I know: 1 minute = 42 times 60 minutes = 1 hour Need: 2 hours?

60 x 42 = one hour (2,520) so, 2,520 x 2 = 5,040 jumps

ACE: The answer is 5,040 jumps. To answer the problem I needed to know how many jumps she could make in 2 hours. There are 60 minutes in one hour and she can jump 42 times in one minute. I multiplied 42 x 60 to find out how many jumps are in 1 hour. Next, I multiplied that answer, 2,520 x 2. She can jump 5,040 jumps in 2 hours.
Using the 10 Times Table to Multiply

If you know the 10 times table, you can find the 11 and 12 times tables too!

12 sevens = 10 sevens + 2 sevens
12 × 7 = (10 × 7) + (2 × 7)
= 70 + 14
= 84

1. Write the 10 times table, and then add to write the 11 times table.

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2. Write the 10 times table and the 2 times table, and then add to write the 12 times table.

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Target age is grades 4-6.
Pythagorean Theorem

\[ x^2 + y^2 = \text{distance}^2 \]

Directions:
Click the View Sim button to see how the distance between two characters is computed during a video game.
Poll

What is your level of interest in digital curriculum?

- Just looking at the new technologies
- Interested in grants and funding options for my school’s new program
- Interested in examples of digital curriculum case studies
- Researching possible software solutions for my school
- Interested in pricing and a buyer’s guide
- Interested in viewing a demo
Great hand picked math tools, tips, and lesson plans perfect for your classroom. Discover new ready-to-use resources for building conceptual understanding and problem-solving skills in everything from counting and operations to algebra and geometry.
### Matific

**Engaging supplemental resource encourages conceptual understanding**

**Visit Website**

**GRAPHITE RATING**

**TEACHER RATING (1 TEACHER REVIEW)**

<table>
<thead>
<tr>
<th>PRICE</th>
<th>GRADES</th>
<th>PLATFORMS</th>
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<tbody>
<tr>
<td>Free, Free to Try</td>
<td>K-6</td>
<td>Website</td>
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**Show Additional Product & Pricing Details**

**SUBJECTS**

- Math

**SKILLS**

- Critical Thinking

**PURPOSE**

- Targeted Practice

**STANDARDS**

- Common Core State Standards

**PROS**

A variety of visual activities help kids gain a conceptual understanding of important K-6 math skills.

**CONS**

An adaptive feature could help teachers in meeting kids right at their level.

**BOTTOM LINE**

A fun and engaging conceptual supplement for math lessons with easy-to-find standards-aligned activities.

---

**GRAPHITE EXPERT REVIEW**

Debbie Gorrell  
Common Sense Graphite Reviewer

**WHAT'S IT LIKE?**

Matific is a collection of interactive math games and activities for grades K-6 aimed at helping kids build a conceptual understanding of various foundational skills. The wide variety of activities and worksheets are well organized and easy to navigate. Kids can access the resources by grade level or, more specifically, by topic within each grade. Some grade levels have more resources -- and cover more

---

**LEARNING SCORES**

* Graphite Rating: 4.5/5

### Common Core

<table>
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<th>Common Core Standards</th>
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<tbody>
<tr>
<td>- Fractions</td>
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</tbody>
</table>
1st Grade
- Episodes: 115
- Worksheets: 55
- Playlists: 12

View All

- Cherry Chomp
  - Subtract Tens
  - 0-100, Subtraction, Ten
  - Rating: ★★★★★
  - Reviews: 3

- Early Bird
  - Odd and Even
  - Party
  - Rating: ★★★★★
  - Reviews: 3

- Birds of a Feather
  - Add up to 20
  - 0-20, Addition, Place Value
  - Rating: ★★★★☆
  - Reviews: 1

2nd Grade
- Episodes: 95
- Worksheets: 63
- Playlists: 14

View All

- Weighing the Options
  - Add and Subtract
  - 0-20, Addition, Problem Solving, Subtraction
  - Rating: ★★★★☆
  - Reviews: 1

- In the Cards
  - Make 100: Pairs
  - 0-100, Addition, Hundred
  - Rating: ★★★★★
  - Reviews: 2

- PolyGolf
  - Classify Polygons: Level I
  - Angle, Classification, Edge, Polygon, Vert
  - Rating: ★★★★★
  - Reviews: 3
Help kids master basic math facts

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Progress Quiz
Addition

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Parents, start here

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Data reports available on Khan Academy

<table>
<thead>
<tr>
<th>Multipliation and Division</th>
<th>Struggling</th>
<th>Needs Practice</th>
<th>Practiced</th>
<th>Level One</th>
<th>Level Two</th>
<th>Mastered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole numbers on the number line</td>
<td>Owen Shin</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
“Every time I play DreamBox, I get a little smarter!”
Watch the video to see how we help kids make sense of math.
Keeping things running smoothly

Quality Check partners
Student Experts
Flowcharts
Anchor chart for using resources.
Math speak: vocabulary **Word wall**
Consistent Practices
Pacing Guides with Performance Assessments
### DeKalb Central Math Consistent Practices: 60-minute block

#### Circle the most appropriate number:

1. I am beginning to do this
2. This is progressing well.
3. This is a consistent practice.

<table>
<thead>
<tr>
<th>Teacher provides a mathematically rich environment including a group meeting area, anchor charts, small group meeting area, and areas for independent work.</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core components and materials are being used consistently. Components: practice, investigation, problem solving, vocabulary and written expression of mathematical thinking.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Whole group focus or mini lesson occurs <strong>every day</strong>.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>A focus or mini lesson purpose statement is posted on chart paper, Pro Board or anywhere in the room and will be visible to whomever might enter the room. The focus or purpose for math will be clearly stated.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Anchor charts are displayed to reference important learning.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Teacher uses Gradual Release of Responsibility to provide explicit instruction by modeling (‘I do’), guided practice (‘We do’), and independent practice (‘You do’) including timely, informative feedback and re-teaching when needed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Teacher uses engagement strategies: turn and talk, signaling response, wipe-off boards, think-pair-share, post-its, exit slips, etc.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Small group conferencing occurs <strong>every day</strong>.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Teacher meets with intensive (red) and strategic (yellow) groups every day during small group instruction.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Teacher meets with benchmark (green) groups at least 3 times per week during small group instruction.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Teacher meets with high ability (blue) groups at least 2-3 times per week during small group instruction.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Student practice requires independent every day.</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
DeKalb Central Consistent Practices: Small Group Math

Circle the most appropriate number:

1. I am beginning to do this
2. This is progressing well.
3. This is a consistent practice.

| Students are grouped according to need. | 1 | 2 | 3 |
| Teacher selects a skill or concept for a specific instructional purpose. | 1 | 2 | 3 |
| Lessons are well planned with a clear instructional focus. | 1 | 2 | 3 |

Start of Group/Conference:
Teacher provides an overview or review of the concept, incorporates anchor charts and introduces new vocabulary. Teacher gives students a time to show their work (i.e. whiteboards, or group question paper) and explain their thinking.

During:
Students work independently or with a peer while you provide probing questions, check for understanding and teach individual students.

End:
Teacher and students discuss the assigned independent practice to ensure clarity of expectations.

Students demonstrate their thinking on whiteboards, paper, etc.

Teaching point is made clear to students.

Teacher provides the opportunity to re-teach practice to improve math skills.

Teacher may provide an opportunity to extend the learning through various formats: Educreations, Moviemaker, PowerPoint, Prezi, Journals, Pamphlets or programs such as: Math Apprentice, Moby Max, XtraMath, and DreamBox.

Teacher takes anecdotal records on observable conceptual understanding and notes future teaching points.

| 1 | 2 | 3 |
Math Intervention Flow

- DreamBox: 1-2 unique lessons
- 1:1 Intensive or small group instruction based on data
- # of the day activity - problem solving
- Hands on Application: activities that relate to their learning.
Intervention Guide with specific resources to use for each skill.

Skills are linked with DreamBox.

*Identifying More, Less and Equal
1. Acing Math Book: Greater or Less than pg. 9
2. # Bing: Create boards: You say 4 and they find greater than, less, equal
3. Jump Math 23, 78, 47 Jump 1.1: pg 10
4. Math is Fun Worksheets
5. Unifix Cubes: Putting together and compare

*Ordering numbers: Missing #’s 1-100
1. Ice Cream Sprinkle Folder
2. Acing Math: Number Battle p. 10
3. Math is Fun Worksheets
4. Jump Math pg. 9
5. Envision Booklet A: Ordering Numbers to 12 pg. 117, 118, 119, 120
6. Unifix Cubes: Build and then place in folder
7. Do the Math- Book A (+, -): Lesson 14

Addition and Subtraction
*Identify missing addend: Find a missing part when given a part (3-10)
1. Jump Math 48
2. Jump 1.1 28 (charts), 32
3. Acing math: I Spy Sums p. 48
*Beginning adding and removing
MULTIPLICATION AND DIVISION

**Use:**
1. Do the Math Book B for multiplication and fractions: start to finish
2. Timemonsters.com

**Identify Common Multiples:** find common multiples of 2 factors (2-12)
1. Envision Math: Booklet G page 207

**Identify factors: up to 100**
1. Envision Math: Booklet G page 205

**Multiply Mixed Strategies:** Commutative property (3x5=5x3)
1. Jump Math: 4.2 page 55
2. Teaching Arithmetic: Extending Multiplication Gr 4-5
   - Chapters: 3. One hundred Hungry Ants Pgs. 23-36
   - Use with book: One Hundred Hungry Ants

**Multiplication with open arrays:** Solve multi-digit multiplication problems using distributive property and place value.
1. Envision Math: booklet G page 121
2. Envision Math: booklet F page 135
3. Jump Math: 4.1 page 68 (NSA 4-31)
5. Do the Math: Book C (x): Splitting Strategy, egg cartons, pathways games: Lessons 9,
Questions?

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Ktipton@dekalbcentral.net
260-910-1060 ext: 6157
DreamBox Learning® K-8 Math
Available in English & Spanish

Rigorous Mathematics Curriculum
• Reporting Aligned to CCSS, Texas TEKS, Virginia SOL, Canada WNCP, & Canada Ontario Curriculum Reports
• Standards for Mathematical Practice

Motivating Learning Environments
• Student Directed, Empowering
• Leverages Gaming Protocols

Intelligent Adaptive Learning Engine
• Millions of personalized learning paths
• Tailored to a student’s unique needs
DreamBox Lessons & Virtual Manipulatives

Intelligently adapt & individualize to:

- Students’ own intuitive strategies
- Kinds of mistakes
- Efficiency of strategy
- Scaffolding needed
- Response time
Insight Dashboards

Colburn - 5th Grade

5th Grade
John Lincoln Middle

Despite consistent use of the tool, Bill’s class is lagging behind in their understanding of fractions against the rest of the school and the CCSS standards.

20,907 lessons completed this year
46% total growth this year

Collin - 5th Grade

John Lincoln Middle

The student describes relationships mathematically. The student is expected to select from and use diagrams and equations such as y = x + 3 to represent meaningful problem situations.

Joel de Jong
Lesson Complete
Fractions & Decimals: Multi-Mixed Strategies
Students explore the commutative property (3 x 5 = 5 x 3) and apply various strategies to solve double-digit multiplication problems.

Spring Hill
Lesson In Progress
Estimation, Distribution, and the Standard Algorithm
Students multiply by friendly numbers greater than 20.

Steve McIntyre
Lesson Group Complete
Fractions & Decimals: Multi-Mixed Strategies
Students explore the commutative property (3 x 5 = 5 x 3) and apply various strategies to solve double-digit multiplication problems.
Seeing is believing!

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We value your feedback, compliments, suggestions, and complaints!

Let us know how we’re doing:

https://www.surveymonkey.com/r/PXT8D5M