Summing it all up: Mathematics in Radnor Schools

November 15, 2012
Agenda

- Opening
- “Algebra-for-All”
  - Concept
  - Actual Outcomes
    - RMS
    - RHS
  - Keystone Exams
- Recommendations & Developments
  - Iterative process
  - K-12 “Roadmap”
  - CCFG
  - Q/A?
The purpose of instituting community information sessions is to provide access to information about our district initiatives on video, podcast and in written notes archived, by topic, on the district website for “on demand” access.
“Algebra for All”

- Premise & Promise

- Outcomes
  - Experiences
  - Data

What Links Arithmetic to Mathematics?
Common Core: Standards of Mathematical Practice

- Proficient students:
  - Make sense of problems and persevere in solving them
  - Reason abstractly & quantitatively
  - Construct viable arguments and critique the reasoning of others
  - Model with mathematics
  - Use appropriate tools strategically
  - Attend to precision
  - Look for and make use of structure
  - Look for an express regularity in repeated reasoning
Radnor Graduate

- By the end of 12th grade, all students should be ready to take calculus

- Many will exceed this goal, but increasing numbers of students are not able to achieve this goal.
“Algebra for All” at RMS
RMS Algebra

● Prior to “Algebra for All”
  ● Only Honors and Seminar level students completed Algebra by the end of grade 8

● Impacts of “Algebra for All” on students
  ● Perceptions of teachers
  ● Data on learning
Teacher Perceptions
"Many times when I taught Advanced Algebra to students in one year, I felt I was teaching Algebra 1 Lite. I was leaving out many things so there was time to practice what we were trying to master."

"It made my heart ache to 'have to move on' to complete the curriculum in one year when I knew several students did not understand the concept I was leaving."
Student Learning Data

PSSA 8th Grade Mathematics
2011 Keystone Exam Results
8th Grade PSSA Scores are Static

- 2008: 91%
- 2009*: 88%
- 2010: 93%
- 2011: 96%
- 2012: 93%

2013 AYP Target = 89%
2012 AYP Target = 78%

- Red: Not Proficient
- Green: Proficient
PSSA Achievement Remains High...

8th Grade 2012 PSSA

<table>
<thead>
<tr>
<th>Category</th>
<th>Score Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>1446 – and up</td>
</tr>
<tr>
<td>Proficient</td>
<td>1284 – 1445</td>
</tr>
<tr>
<td>Basic</td>
<td>1171 – 1283</td>
</tr>
<tr>
<td>Below Basic</td>
<td>700 – 1170</td>
</tr>
<tr>
<td>RTSD Average</td>
<td>1619</td>
</tr>
</tbody>
</table>

Overall Proficiency Rate = 93%
2012 AYP Threshold = 78%
...But, State Expectations for PSSA are Low

**Individual Student Projection Report**

![Graph showing state percentiles over years](image_url)
2011 RMS 8th Grade
% Correct PSSA Skill Category by Course Level

Source: PSSA Spring 2011 Raw Data File (Cannella, 2012)
Observations & Conclusions

- PSSA Performance remains high, but drops off with academic level

- Addressing areas of weakness with additional supports and practice opportunities
Keystone Exam Results
8th Grade, Spring 2011
Keystone Exams

- End-of-Course Exams
  - From the Pennsylvania Department of Education
  - When students finish the course, they are to take the exam
  - Proficiency is required for class of 2017 (current 8th graders) and beyond in Biology, Algebra, and Literature in order to graduate

- Does “Algebra for All” prepare All students to be successful on the Keystone?
RTSD Outperformed the State on the 2011 Keystone

PA State-wide Keystone Algebra Results

- Advanced: 11%
- Proficient: 20%
- Basic: 42%
- Below Basic: 27%

RTSD 8th Grade Algebra Keystone 2011

- Advanced: 5%
- Proficient: 30%
- Basic: 27%
- Below Basic: 38%

Source: Keystone Algebra 1 Summary Report (PDE, 2011)

Source: Keystone Spring 2011 Raw Data File (Kindred, 2011)
RTSD Outperformed the State on the 2011 Keystone

PA State-wide Keystone Algebra Results

- Passed: 39%
- Failed: 61%

RTSD 8th Grade Algebra Keystone 2011

- Passed: 68%
- Failed: 32%

Source: Keystone Spring 2011 Raw Data File (Kindred, 2011)
Source: PSSA Spring 2011 Raw Data File (Cannella, 2012)
Keystone Exam is Significantly Harder than the PSSA

RTSD 8th Grade PSSA 2011

- Passed: 96%
- Failed: 4%

RTSD 8th Grade Algebra Keystone 2011

- Passed: 68%
- Failed: 32%

Source: Keystone Spring 2011 Raw Data File (Kindred, 2011)
Source: PSSA Spring 2011 Raw Data File (Cannella, 2012)
The Majority of Keystone Algebra Failures Came from College-Prep Level

- **Seminar**: 2 Advanced, 7 Proficient, 55 Below
- **Honors**: 42 Advanced, 45 Proficient, 65 Basic, 13 Below
- **Regular (Advanced & Intro)**: 5 Advanced, 37 Proficient, 65 Basic, 13 Below
Observations

- Teacher perceptions and data suggest
  - Some students simply aren’t ready

- Keystone Results
  - RTSD outperformed the state, **BUT**
  - 1/3 of our 8th grade students failed the Algebra Keystone Exam
  - The majority of college-prep students failed the Keystone Exam
RHS Math Impact

PSSA Score Performance Lost
Calculus Enrollment Stagnant
Data about student enrollment in other courses (proportions in levels)
Data about course changes due to lack of foundational skills
The necessity to create new courses
Adequate Yearly Progress (AYP) Targets

2010 - 2011
- Reading = 72%
- Math = 67%

2011 - 2012
- Reading = 81%
- Math = 78%

2012 - 2013
- Reading = 91%
- Math = 89%

2014
- Reading = 100%
- Math = 100%

Source: http://paayp.emetric.net
RHS PSSA Achievement Static

2013 AYP Target = 89%
2012 AYP Target = 78%

Not Proficient
Proficient

<table>
<thead>
<tr>
<th>Year</th>
<th>Not Proficient</th>
<th>Proficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>16.7</td>
<td>83.3</td>
</tr>
<tr>
<td>2008</td>
<td>16.4</td>
<td>83.6</td>
</tr>
<tr>
<td>2009</td>
<td>14.7</td>
<td>85.3</td>
</tr>
<tr>
<td>2010</td>
<td>14.3</td>
<td>85.7</td>
</tr>
<tr>
<td>2011</td>
<td>15.2</td>
<td>84.8</td>
</tr>
<tr>
<td>2012*</td>
<td>18.1</td>
<td>81.9</td>
</tr>
</tbody>
</table>
Enrollment in Calculus Has Not Increased

- Out of the 98 juniors last year who were in geometry in 9th grade only 20 (20.4%) will take calculus next year.
- A new Algebra 3 course had to be created to remediate struggling students.
- There has been a 27.3% reduction in the number of students taking seminar or honors math since 2008.
Current Junior Class

- First to have Algebra 1 as 8th graders
- 98 students were enrolled in advanced geometry and geometry as 9th graders.
  - 52 of them have dropped to Algebra 3 (53%) as of last spring
Class Changes

- A new course, *Algebra 3*, needed to be created to accommodate struggling students.
- These students are not able to complete *Precalculus* by the end of 12th grade
  - And are therefore not ready for calculus in college
- Of the former “*Algebra in 9th grade*” population
  - 65% of them have dropped one or more levels since entering high school
Conclusion & Recommendation

- “Algebra for All” did not work as promised at RMS or RHS
- “Algebra for All” did not prepare 1/3 of students to pass the Keystone Exam
- Changes must be made to RMS math programming to ensure that all current 8th graders succeed on Algebra 1 Keystone Exam by 2017
- Propose an alternate to the “Algebra for All” program for our college-prep level students
RTSD Math Vertical Team
2-year Proposal for RMS Math Program
Vertical Team

- Convened in 2011-2012 school year by Dr. Maguire
- Comprised solely of Math Educators from RMS and RHS

- RMS
  - M. Costello (Department Chair)
  - M. Malinchak
  - K. Rapino
  - N. Kindred

- RHS
  - M. McBride (Department Chair)
  - K. Troland
Course Sequence Approved
February 14, 2012

6th Math Seminar
(Course 3) → 7th Algebra 1 Seminar → 8th Seminar Geometry

6th Math Honors
(Course 2) → 7th Math Honors
(Course 3 Topics & Intro to Algebra) → 8th Algebra 1 Honors

6th Math
(Course 2) → 7th Math
(Course 3) → 8th Intro to Algebra
Summer 2012 Events

- Parent Concerns
- Modifications to placement protocols
- Waiver Option Offered
  - Investigational basis
    - to 76th %ile in 7th grade
    - to 80th %ile in 8th grade
Keystone Exams

- **Proficiency is required** for class of 2017 (current 8th graders) and beyond in Biology, Algebra, and Literature **in order to graduate**

- Legislative requirements for non-proficient students
  - Remediation class would take a place of an empty period
  - Could result in loss of elective opportunities
  - Retesting requirement
Concomitant Work

- Monitoring student achievement for all using common unit tests since September

- Desire to prepare the maximum number of students to be successful
  - On the Keystone Exam at the end of Algebra
  - In future math classes at RHS
Concomitant Work

- **Now**
  - Letters home; discussions with families of students not being successful

- **Mid Year**
  - Evaluate performance
    - If in 8th grade - must move down to Intro
    - If in 7th grade - either move and/or move down in 8th

- **EOY**
  - Any student who is unsuccessful on the Keystone Algebra exam must take a remedial course at RHS
K-12 Roadmap

- Frequent Revisions
- Shows course opportunities
- “No vs. Not Now”
Getting to Calculus

- Options for getting to calculus
  - Currently in existence
  - Being discussed and explored

- Pre-calculus as a senior

- AP Calculus exam acceptance policies at top schools
Preparing for Keystone 2013

Testing schedule
Work currently underway in RTSD
# Keystone Algebra

<table>
<thead>
<tr>
<th>Students in..</th>
<th>Taking…</th>
<th>Will take the exam…</th>
<th>For the purposes of…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 7</td>
<td>Algebra</td>
<td>Spring 2013</td>
<td>Graduation Requirement, HS AYP in 2017</td>
</tr>
<tr>
<td>Grade 8</td>
<td>Algebra</td>
<td>Spring 2013</td>
<td>Graduation Requirement, HS AYP in 2016</td>
</tr>
<tr>
<td>Grades 9-11</td>
<td>Algebra</td>
<td>Spring 2013</td>
<td>HS AYP when they are in 11th grade</td>
</tr>
<tr>
<td>Grade 8</td>
<td>Geometry</td>
<td>Winter 2012</td>
<td>Graduation Requirement, HS AYP in 2016</td>
</tr>
<tr>
<td>Grade 9-10</td>
<td>Geometry and beyond</td>
<td>Winter 2012</td>
<td>HS AYP when they are in 11th grade</td>
</tr>
<tr>
<td>Grade 11</td>
<td>Geometry and beyond</td>
<td>Winter 2012</td>
<td>HS AYP in 2013</td>
</tr>
</tbody>
</table>
Preparing for Keystones 2013

- Current work
  - Assessment of student knowledge
    - Locally developed test
      - Baseline data for Algebra students
      - Evaluation of needs for Geometry+ students
  - RHS Math teachers analyzed the results on the afternoon of 11/5/2012
    - Statistics, certain Algebra concepts
  - Working with other districts
    - Create a pool of resources through contacts
    - LTF materials
CCFG
Cross-Class Flexible Grouping
CORE BELIEFS

- Every child is different.

- We want every RTSD student to grow socially, emotionally, and academically to their fullest potential.

- Every child deserves to be engaged in activities that promote their own individual learning.
Fall 2012 Math MAPS Data

Grade 3

RIT Band

20% ile

93 %ile

RTSD Analysis by J. Cannella; Percentile ranks provided from NWEA 2011
### Instructional implications

<table>
<thead>
<tr>
<th>RIT = 171-180</th>
<th>RIT = 221-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills to Introduce</td>
<td>Skills to Introduce</td>
</tr>
<tr>
<td>Adds two or three 2-digit number with regrouping</td>
<td>Multiplies multiple-digit numbers</td>
</tr>
<tr>
<td>Adds 1- and/or 2-digit numbers with sums under 100</td>
<td>Divides a 4-digit number by a 2-digit number</td>
</tr>
<tr>
<td>Adds 3-digit numbers with no regrouping</td>
<td></td>
</tr>
</tbody>
</table>

©2012 NWEA. DesCartes: A Continuum of Learning
Fall 2012 math maps data

Class Average = 209 (91st %ile)

Grade 3 – Selected Classroom

RTSD Analysis by J. Cannella; Percentile ranks provided from NWEA 2011
Students with identical scores can show disparate readiness levels

<table>
<thead>
<tr>
<th>RIT Band</th>
<th>191-200</th>
<th>201-210</th>
<th>211-220</th>
<th>221-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (194)</td>
<td>F (203)</td>
<td>L (213)</td>
<td></td>
<td>S (222)</td>
</tr>
<tr>
<td>B (197)</td>
<td>G (204)</td>
<td>M (214)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C (198)</td>
<td>H (204)</td>
<td>N (214)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D (199)</td>
<td>I (204)</td>
<td>O (214)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E (200)</td>
<td>J (208)</td>
<td>P (217)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K (210)</td>
<td></td>
<td></td>
<td>R (219)</td>
<td></td>
</tr>
<tr>
<td>L (213)</td>
<td></td>
<td></td>
<td></td>
<td>S (222)</td>
</tr>
<tr>
<td>M (214)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N (214)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O (214)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P (217)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q (218)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R (219)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Class Distribution by Mathematics Strand

NWEA Data corroborates instructional experiences, parent perceptions, and common sense: students possess different levels of readiness depending on the topic.
Students with identical scores can show disparate readiness levels

<table>
<thead>
<tr>
<th></th>
<th>191-200</th>
<th>201-210</th>
<th>211-220</th>
<th>221-230</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>194</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>197</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>198</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>199</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>203</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>204</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>204</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>204</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>208</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>210</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>213</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>214</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>214</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>214</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>217</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>218</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>219</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RIT Band
### Test Name: Math Survey w/ Goals 2-5

<table>
<thead>
<tr>
<th>Class Distribution</th>
<th>by Mathematics Strand</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Algebraic Thinking</strong></td>
<td>NWEA Data corroborates instructional experiences, parent perceptions, and common sense: students possess different levels of readiness depending on the topic</td>
</tr>
<tr>
<td><strong>Fractions</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Geometry</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Measurement &amp; Data</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Number &amp; Operations</strong></td>
<td></td>
</tr>
</tbody>
</table>
Students with widely divergent scores can show similar readiness levels

|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
### Test Name: Math Survey w/ Goals 2-5

<table>
<thead>
<tr>
<th>Test Name: Math Survey w/ Goals 2-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 181</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>L (213)</td>
</tr>
<tr>
<td>C (198)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>K (210)</td>
</tr>
<tr>
<td>D (199)</td>
</tr>
<tr>
<td>B (197)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>M (214)</td>
</tr>
<tr>
<td>J (208)</td>
</tr>
<tr>
<td>E (200)</td>
</tr>
<tr>
<td>B (197)</td>
</tr>
</tbody>
</table>

### Class Distribution by Mathematics Strand

NWEA Data corroborates instructional experiences, parent perceptions, and common sense: students possess different levels of readiness depending on the topic.
New data tools reveal that not all students are making a year's worth of growth in a year's worth of time.

### PVAAS Growth Data (5th Grade Math)

<table>
<thead>
<tr>
<th>Grade</th>
<th>% Meeting NWEA Growth Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>67.6</td>
</tr>
<tr>
<td>2</td>
<td>53.6</td>
</tr>
<tr>
<td>3</td>
<td>67.0</td>
</tr>
<tr>
<td>4</td>
<td>62.2</td>
</tr>
<tr>
<td>5</td>
<td>71.8</td>
</tr>
</tbody>
</table>

### PVAAS Growth Data (6th Grade Math)

```graph
<table>
<thead>
<tr>
<th>Grade</th>
<th>% Meeting NWEA Growth Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>67.6</td>
</tr>
<tr>
<td>2</td>
<td>53.6</td>
</tr>
<tr>
<td>3</td>
<td>67.0</td>
</tr>
<tr>
<td>4</td>
<td>62.2</td>
</tr>
<tr>
<td>5</td>
<td>71.8</td>
</tr>
</tbody>
</table>
```
Zone of Proximal development

Concept developed by Lev Vygotsky, a Soviet psychologist

Learning does not occur if there is not a match between the level of challenge and the level of competence.

http://lmrtriads.wikispaces.com/Zone+of+Proximal+Development
# Common Grouping Arrangements

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Whole-Group Instruction</th>
<th>Flexible Grouping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Size</td>
<td>All students in one large group</td>
<td>Variable use of large group, small group, partner, and individual work</td>
</tr>
<tr>
<td>Membership</td>
<td>Heterogeneous</td>
<td>Greater level of homogeneity</td>
</tr>
<tr>
<td>Purpose</td>
<td>Build community and contribute to an effective use of resources and time by providing the same instruction to all</td>
<td>Differentiate instruction while building a classroom community in an effective use of time and materials</td>
</tr>
<tr>
<td>Texts</td>
<td>Same text for all students</td>
<td>Variable use of same texts or multiple connected texts</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>Inequity of access to instructional level texts</td>
<td>Need for students and teacher to be able to flow in and out of a variety of grouping patterns across lessons</td>
</tr>
<tr>
<td>Affective Concerns</td>
<td>Disengagement of students for perceived lack of challenge or lack of success</td>
<td>Structures may contribute to affective concerns</td>
</tr>
</tbody>
</table>

# Common Grouping Arrangements

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Whole-Group Instruction</th>
<th>Flexible Grouping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Size</td>
<td>All students in one large group</td>
<td>Variable use of large group, small group, partner, and individual work</td>
</tr>
<tr>
<td>Membership</td>
<td>Heterogeneous</td>
<td>Greater level of homogeneity</td>
</tr>
<tr>
<td>Purpose</td>
<td>Build community and contribute to an effective use of resources and time by providing the same instruction to all</td>
<td>Differentiate instruction while building a classroom community in an effective use of time and materials</td>
</tr>
<tr>
<td>Texts</td>
<td>Same text for all students</td>
<td>Variable use of same texts or multiple connected texts</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>Inequity of access to instructional level texts</td>
<td>Need for students and teacher to be able to flow in and out of a variety of grouping patterns across lessons</td>
</tr>
<tr>
<td>Affective Concerns</td>
<td>Disengagement of students for perceived lack of challenge or lack of success</td>
<td>Structures may contribute to affective concerns</td>
</tr>
</tbody>
</table>

You can boil the last fifty years of educational research down to four words—

**Kids differ; teachers matter.**


*What Really Matters for Struggling Readers*
HYPOTHETICAL

What if we do nothing differently?
If we do nothing differently

- **We must act in opposition to our beliefs**
  - We must not believe that all children are different
  - We must not believe that we want all children to grow
  - We must not believe that all children deserve appropriate instruction at their level

- **We must ignore the data**
  - We must ignore information and common sense that every child is different
  - We must ignore the fact that not all children are growing
  - We must ignore the data that some students are bored and some students need more practice in grade-level schools
Lessons from Literacy Instruction
A lesson from literacy instruction

Anyone who thinks there is one right way to teach reading has never worked with two children.

Michael Ford (2005)
Differentiation Through Flexible Grouping: Successfully Reaching All Readers

http://www.learningpt.org/pdfs/literacy/flexibleGrouping.pdf
# Common Grouping Arrangements

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Whole-Group Instruction</th>
<th>Flexible Grouping</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group Size</strong></td>
<td>All students in one large group</td>
<td>Variable use of large group, small group, partner, and individual work</td>
</tr>
<tr>
<td><strong>Membership</strong></td>
<td>Heterogeneous</td>
<td>Greater level of homogeneity</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>Build community and contribute to an effective use of resources and time by providing the same instruction to all</td>
<td>Differentiate instruction while building a classroom community in an effective use of time and materials</td>
</tr>
<tr>
<td><strong>Texts</strong></td>
<td>Same text for all students</td>
<td>Variable use of same texts or multiple connected texts</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td>Inequity of access to instructional level texts</td>
<td>Need for students and teacher to be able to flow in and out of a variety of grouping patterns across lessons</td>
</tr>
<tr>
<td><strong>Affective Concerns</strong></td>
<td>Disengagement of students for perceived lack of challenge or lack of success</td>
<td>Structures may contribute to affective concerns</td>
</tr>
</tbody>
</table>

# Literacy vs. Math

<table>
<thead>
<tr>
<th>Literacy</th>
<th>Math</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Big 5</strong></td>
<td><strong>NCTM Standards</strong></td>
</tr>
<tr>
<td>Phonemic Awareness, Phonological Reasoning, Fluency, Vocabulary, Comprehension</td>
<td>Numbers &amp; Operations, Algebra, Geometry, Measurement, Data Analysis &amp; Probability</td>
</tr>
<tr>
<td><strong>Common Core</strong></td>
<td><strong>Common Core</strong></td>
</tr>
<tr>
<td>Reading Literature, Reading Informational Text, Reading Foundational Skills, Writing, Speaking &amp; Listening, Language</td>
<td>Counting &amp; Cardinality, Number &amp; Operations in Fractions, Operations &amp; Algebraic Thinking, Number &amp; Operations in Base 10, Measurement &amp; Data, Geometry, Ratios and Proportions</td>
</tr>
</tbody>
</table>
CCFG DESIGN
Traditional Instruction-Assessment “Cycle”
Flexible Grouping in Math

- Cyclic nature of instruction
- All elementary students
  - Grade 1
    - 2nd half of year only
  - Grade 5
    - (if not in Advanced Mathematics)
- Targeted math instruction tailored to needs depending on topic/unit
Methodology

- **Unit-by-Unit Strategy**
  - Unit 1 with “homeroom” teacher
  - Subsequent units
    - Pretest using tests aligned to end-of-unit goals/skills
    - Regroup for instruction according to performances
    - Teachers will rotate and share responsibilities

- **Benefits**
  - Sharpens teaching focus
  - Students interacting with others at similar readiness levels
  - Customized level of challenge topic-by-topic
  - Cultivates student growth for all
    - Identifies and fills gaps
    - Avoids redundant instruction
What Else Have We Tried or Considered?

- Professional development
- In-class differentiation
- Pull-out assistance for individual students
- Use of I/E time to provide enrichment and remediation
- Use of teacher prep and lunch times to provide remediation
- This very strategy in smaller-scale implementations in each building
CCFG Planning Team

- RES
  - S. McDermott, M. Bare, C. McManimen
- IES
  - P. Cooper, L. Keenan, R. Rubel, M. Segal, T. Boylan
- WES
  - D. Thomson, H. Esposito, J. Crowe, R. Goldstein, E. Borine
- Other
  - A-J. Cooper, J. Cannella
Work of the CCFG Team

- Considered & Debated
  - Rationale, audience, frequency of regrouping, leveling structure, leveling instrument, group placement criteria, level names, rotation scheme of teachers, issues

- Developed
  - Pretests for each unit in each grade (1-5), a total of more than 50 pretests, all formatted and available electronically
  - Lesson-by-lesson packets for teachers in each grade which include additional practice and extension practice

- Working on
  - Placing challenge problems from Math Forum at Drexel University
Pretests

- **Low-stakes** tests to determine readiness/mastery of upcoming content
  - “Show what you know.”
  - Provide teachers information to inform instructional groups

- Pretests created Summer 2012 for every unit
  - Balanced representation of Part A and Part B (secure and formative goals)

- Administered routinely after the end-of-unit test

- Grade-level teams meet and decide how to meet the needs of students
Benefits of Pretesting

- Allows teachers to see if what is being covered is already mastered.
- Help measure true learning, by comparing pre- and post-tests.
- Gives students a preview of what will be expected of them that actually enhances learning*
- Help teachers generate ideas for future lessons.

Grouping structure

- Students scoring 0% on the pretest need something different than students scoring 90% on the pretest

- No one-size-fits-all approach
  - Flexible, will vary by unit
  - Determined by team based on needs

- Grade-Level Instruction
  - With additional practice and additional extensions as appropriate
Evaluation plan
CCFG Evaluation Plan

- Growth Data
  - After the implementation of CCFG, do more students show growth on measures such as PVAAS and NWEA MAP than in prior years?
  - For which students?

- Post-Test Analysis
  - After the implementation of CCFG, is there a significant positive difference in the level of performance on unit tests indicating greater mastery of the content?
  - For which students?
Questions & Answers

Thank you!