



How Do You Know Your Professional Development Makes a Difference?

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mathsolutions.com/presentations

Questions to guide the session:

- What is the need or problem?
- What's contributing to the need or problem?
- What will remedy the need?
- If PD, what will be the focus?
- What was learned?
- Was it implemented?
- Was the need impacted?

What is the need or problem?

Low student achievement.

What's causing the problem?

And how do we find out?

- Guess
- Gather data and hypothesize
 - Interview Questions
 - Observations
 - Self-assessments

Interview to learn about:

- Background Information
- Alignment of Professional Development to Needs, Goals, and Expectations
- Follow-up and Implementation
- Standards and Assessment
- Audience
- Logistics

Example Interview Questions

- What do you see and hear during math instruction? What are students doing? What are teachers doing?
- What would you like to see that you're not seeing?
- Based on your school/district data what do you see as your instructional strengths and challenges?
- What instructional initiatives (such as Marzano's strategies, Danielson's framework, etc.) do you have in place?

What questions do you ask or would you want to be asked?

- Background Information
- Alignment of Professional Development to Needs, Goals, and Expectations
- Follow-up and Implementation
- Standards and Assessment
- Audience
- Logistics

Observations

- Done by someone who knows how to look and listen for effective math instruction
- Based on a common understanding of components or aspects of effective math instruction
- Purpose and focus of observation shared with teachers

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Professional Development and Application Tool

- **Part 1 Planning for Instruction**
 - Curriculum and Standards
 - Lesson Planning
- **Part 2: Instruction**
 - Learning Environment
 - Lesson Introduction
 - Exploration, Explanations, Extensions
 - Active Involvement
 - Variety of Experiences
 - Multiple Grouping Strategies
 - Assessment and Evaluation
 - Lesson Summary
- **Part 3: After Instruction Reflection**

Exploration, Explanations, Extensions	Observed	Not observed	Notes
Active Involvement---The students			
1. <u>understand</u> the expectations of the lesson---how and when they will work independently and/or collaboratively.			
2. <u>work</u> on high level questions.			
3. <u>justify</u> their thinking for either correct and incorrect answers. (MP #3)			
4. <u>seek</u> out multiple approaches to solving a problem.			
5. <u>work</u> well and collaboratively during the lesson.			
6. <u>use</u> mathematical language in their discussions to communicate precisely (math practice #6).			
7. <u>connect</u> their learning to prior knowledge, real-world examples.			
8. <u>connect</u> their learning to the standard for which they are studying.			
9. <u>know</u> what to do when they have completed their work.			

Observation Tool—Excerpt

Exploration, Explanations, Extensions	Observed	Not observed	Notes
Active Involvement---The students			
1. <u>understand</u> the expectations of the lesson---how and when they will work independently and/or collaboratively.	XXXXXXX XXXXXXX		
2. <u>work</u> on high level questions.		X X X X X X X X X X X X X X	
3. <u>justify</u> their thinking for either correct and incorrect answers. (MP #3)	X	X X X X X X X X X X X X X X	
4. <u>seek</u> out multiple approaches to solving a problem.		X X X X X X X X X X X X X X	
5. <u>work</u> well and collaboratively during the lesson.		X X X X X X X X X X X X X X	
6. <u>use</u> mathematical language in their discussions to communicate precisely (math practice #6).		X X X X X X X X X X X X X X	
7. <u>connect</u> their learning to prior knowledge, real-world examples.	X X X X X X X X X X		
8. <u>connect</u> their learning to the standard for which they are studying.	X X X X X X X X X X X		
9. <u>know</u> what to do when they have completed their work.	X X X X X X X X X X		

Observation Sample

Indication for PD Focus on Communication Aspects Not Observed:

- Work on high level questions
- Justify thinking
- Seek out multiple approaches to solve a problem
- Work well and collaboratively
- Use mathematical language in discussions

Self-Assessments

- Based on a common understanding of components or aspects of effective math instruction

Self-assessment for teachers (excerpt)

1 high need
2 moderate need
3 low need
4 no need

Exploration, Explanations, Extensions: I need support with how to:	1	2	3	4
1. <u>set</u> expectations for group work.				
2. <u>elicit</u> /expand upon students' ideas.				
3. <u>pose</u> higher order questions.				
4. <u>probe</u> correct and incorrect answers.				
5. <u>encourage</u> multiple approaches to solving problems.				
6. <u>highlight</u> mathematical language and expect that it be used in discussions.				

Self-Assessment Indicator Categories

- Classroom Management and Environment
- Mathematics
- Instructional Practices and Resources
- Assessment
- Connection Between Home and School

Instructional Practices and Resources					
• Articulating clearly my view of teaching mathematics consistent with district and state frameworks	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
• Basing instruction on appropriate learning theories	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
• Planning appropriate instructional activities	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
• Providing a variety of approaches for teaching a concept	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
• Using appropriate questioning techniques to support and deepen understanding	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
• Meeting the diverse needs of students	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
• Helping students learn to communicate orally and in writing	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
I have just begun to think about....		I have some ideas but have more work to do...		I feel clear and confident about...

If Professional Development,
then what features make it
effective and worthwhile?

Effective Professional Development for Mathematics

Experiences should . . .

- Have students' learning as the ultimate goal;
- Support the on-going work of teaching;
- Be grounded in mathematics content;
- Model and reflect the pedagogy of good instruction;

From: *Practice-Based Professional Development for Teachers of Mathematics* by Margaret Schwan Smith. NCTM, 2001.

Experiences should: (cont'd)

- Create some disequilibrium for teachers;
- Encourage teacher collaboration;
- Take into account teachers' contexts;
- Make use of the knowledge and expertise of teachers;
- Be sustained and cohesive;
- Include opportunities to practice and refine learning.

From: *Practice-Based Professional Development for Teachers of Mathematics* by Margaret Schwan Smith. NCTM, 2001.

Five Critical Levels of Evaluation

- Participants' reactions
- Participants' learning
- Organization support and change
- Participants' use of new knowledge and skills
- Student learning outcomes

Guskey, 2002



Participants' Reactions

Course Goals

This course will help you:

- strengthen your math content knowledge for the purpose of making math accessible for students;
- understand how students learn mathematics; and
- implement instructional strategies that promote thinking, reasoning, and making sense of mathematics.

Participant Responses

COURSE FEEDBACK				
	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
This course helped me strengthen my math content knowledge in ways that support my work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This course helped me better understand how students learn math.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This course provided me with instructional strategies that I will use in my math teaching.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I will be a more effective math teacher as a result of participating in this course.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can use what I learned from this course to improve student achievement.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The instructor/instructors effectively facilitated my learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would recommend this Math Solutions course to colleagues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How teachers respond . . .

- 98% of participants reported that they gained new instructional strategies to use in their classrooms
- 98% of participants reported that the Math Solutions instructors were knowledgeable and skilled in facilitating adult learning
- 97% of participants reported that they gained knowledge and strategies that will help them be better math teachers

Participants' Learning

Participants' learning . . .

COURSE LEARNING		This course will help me better use the following strategies in my math teaching:				
		NOT APPLICABLE	STRONGLY AGREE	AGREE	DISAGREE	STRONGLY DISAGREE
	Posing open-ended questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Making problem solving the focus of my mathematics instruction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Using class discussions in small and whole groups to support learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Using context to make math meaningful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Eliciting from students a variety of methods to solve problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Actively engaging students in learning mathematics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Organization Support and Change

Participants' Use of New Knowledge and Skills

Beyond exposure to new ideas,
teachers have to know where they fit,
and they have to become skilled in
them . . . not just like them.

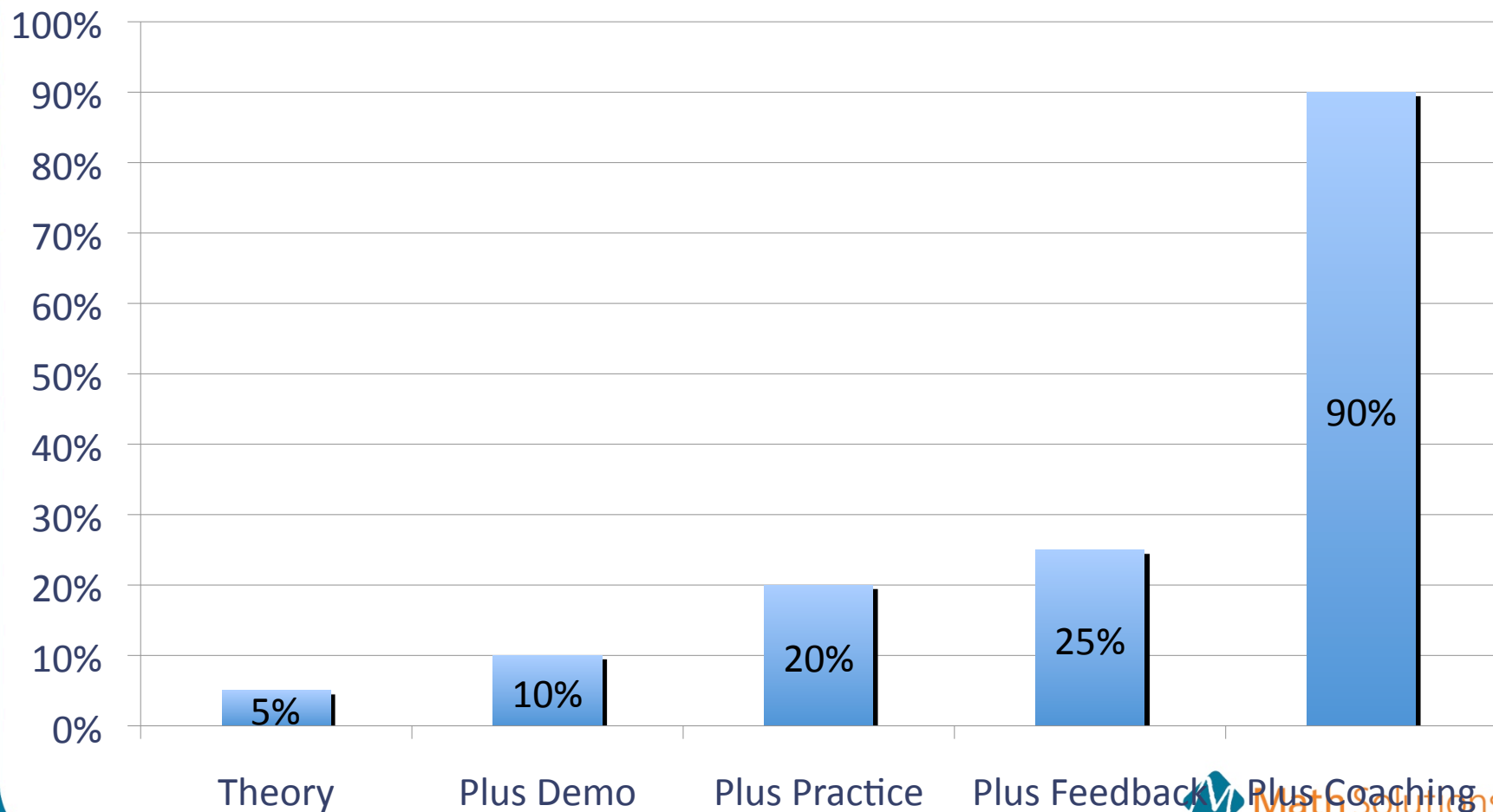
Michael Fullan

People behave their way into new
visions and ideas, not just think
their way into them.

Michael Fullan

Coaching is Key

Percentage of Teachers Transferring Skill to Practice



Source: Joyce and Showers, 1987

Coaching supports:

- Goal-setting for implementation of new learning and accountability
- Modeling of new instructional practices
- Planning for use of those practices
- Feedback on implementation
- Reflection and refinement

Accountability, Practice, and Support:

Week 1	One-on-One Conference with Teacher and Coach
Week 2	The teacher would like to be able to: The coach will support the teacher by:
Week 3	The teacher would like to be able to: The coach will support the teacher by:
Week 4	The teacher would like to be able to: The coach will support the teacher by:

Focus for Coaching Visits Month of November

Teacher: Mr. Smith

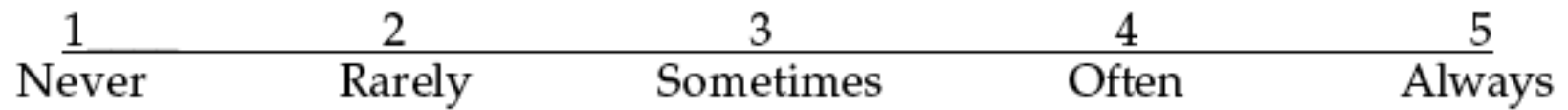
Week 1	One-on-One Conference with Teacher and Coach
Week 2	<p>The teacher would like to be able to: Challenge most mathematically able students</p> <p>The coach will support the teacher by: Bringing open tasks and modeling their use with Week 1 indicator</p>
Week 3	<p>The teacher would like to be able to: Challenge least mathematically able students</p> <p>The coach will support the teacher by: The coach will model the use of a graphic organizer with the students.</p>

Colorado Springs Professional Development Goals

The sessions help teachers learn how to:

- create a classroom environment that promotes the development of number sense and place value and encourages communication about number;
- include problem-solving experiences to help children develop understanding;
- use manipulative materials to support students' learning; and
- integrate assessment and instruction.

Before and Now Scale



INDICATORS
Before June 2007

- | | |
|--|--|
| 1. I provide a variety of approaches for teaching number sense and place value. | <u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> |
| 2. I plan for and implement a problem-solving lesson. | <u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> |
| 3. I use appropriate questioning techniques to support and deepen understanding. | <u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> |

INDICATORS
As of November 2007

- | | |
|--|--|
| 1. I provide a variety of approaches for teaching number sense and place value. | <u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> |
| 2. I plan for and implement a problem-solving lesson. | <u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> |
| 3. I use appropriate questioning techniques to support and deepen understanding. | <u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>5</u> |

1. I provide a variety of approaches for <u>teaching</u> number sense and place value.	0 1 2 3 4
Average starting point:	1.97
Average ending point:	2.94
Change in rating points:	.97
2. I understand how to plan for and <u>implement</u> a problem-solving lesson.	0 1 2 3 4
Average starting point:	2.13
Average ending point:	2.92
Change in rating points:	.79
3. I understand the mathematical purposes <u>of</u> manipulatives and incorporating them <u>into</u> instruction.	0 1 2 3 4
Average starting point:	2.54
Average ending point:	3.13
Change in rating points:	.59
4. I understand appropriate questioning techniques <u>to</u> support and deepen understanding.	0 1 2 3 4
Average starting point:	2.0
Average ending point:	2.93
Change in rating points:	.93

Analysis of teacher self-assessment

As a result of these sessions, I have a deeper
understanding of . . .
I have implemented . . .

- “I’m trying manipulatives I’ve never tried before, like snap cubes. It’s making a difference with my struggling students.”
- “I have started to spend more time having students explain their thinking and am taking time to question more often how they reach an answer.”
- “I have been really paying attention to asking questions, the kinds of questions I ask, and really listening to students’ responses.”
- “I am most excited about using questions to dig deeper and uncover understandings and misunderstandings.”
- “I am thinking more about the needs of different learners and their learning styles.”

Richland One School District, SC

Focus for change:

- Rigorous and relevant math experiences for students
- Student engagement
- Effective lesson planning

Expectations for Implementation:

- Create and retain lesson plans
- Collection of student work
- Ongoing reflections
- Creation of portfolio

Support

- Coaching

Professional Portfolio for Math Instruction



Teacher's Name

Donna Balon

Grade Level

5th

School

Brennan

Richland One School District

Columbia, South Carolina

SCHOLASTIC
ACHIEVEMENT PARTNERS

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Background Information

Did you attend the 2 day rigor/relevance training?

No. Haven't received any formal training.

How many times were you coached?

I was coached 4 times and I also did some co-planning with Jessica during her Feb. and March visits.

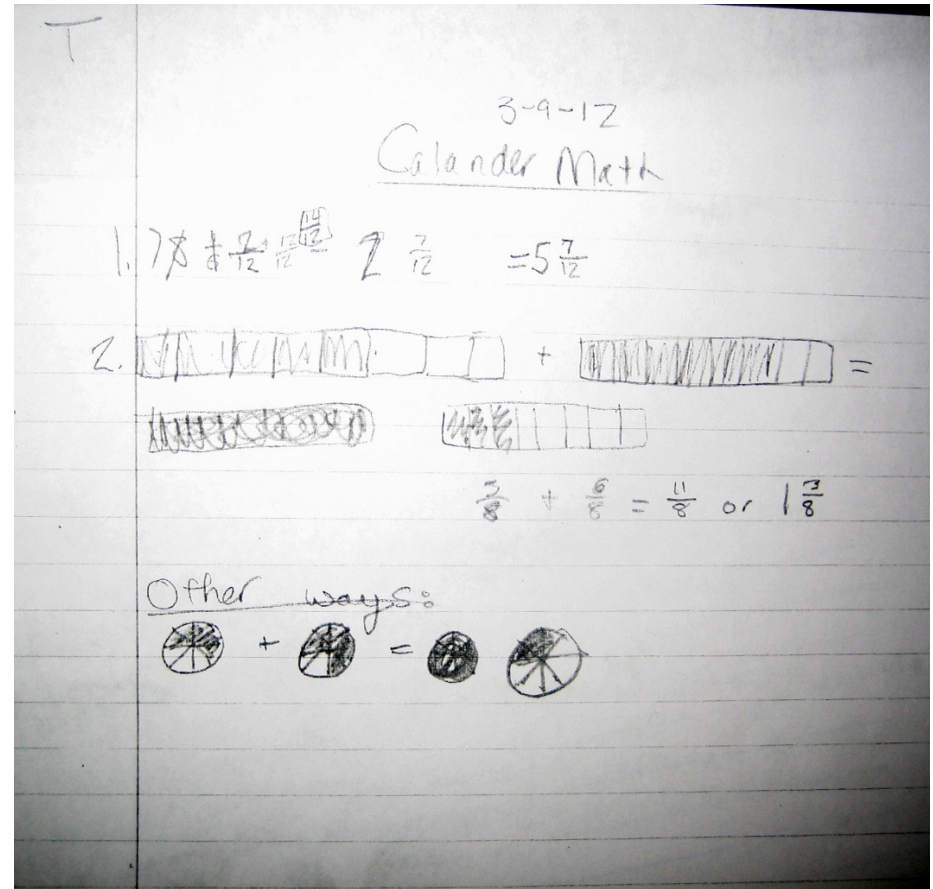
What was your short term goal?

I wanted to use varied strategies and increase my use of open ended explorations.

Portfolio Reflection

Why did you choose this piece?

I chose this piece because it shows more than one way of solving a fraction addition problem. Also when we did this, we talked about different ways even within the types of models that people solved the problem. This illustrates my focus on helping my students understand that there are many ways to solve a problem and visual representations are important in showing understanding of conceptual knowledge.



Portfolio Reflection

Why did you choose this piece?

I chose this activity that was part of Calendar math as an illustration of an open ended exploration. Once the students got over that there wasn't one right answer, they really enjoyed figuring the possibilities of solving this problem. The next day I was able to incorporate one of the possibilities of this problem as a distractor in another problem. This made kind of a continuing story of our calendar math. My goal was also to give them practice in filtering irrelevant information when solving word problems.

ANTICIPATORY SET:

Calendar Math:

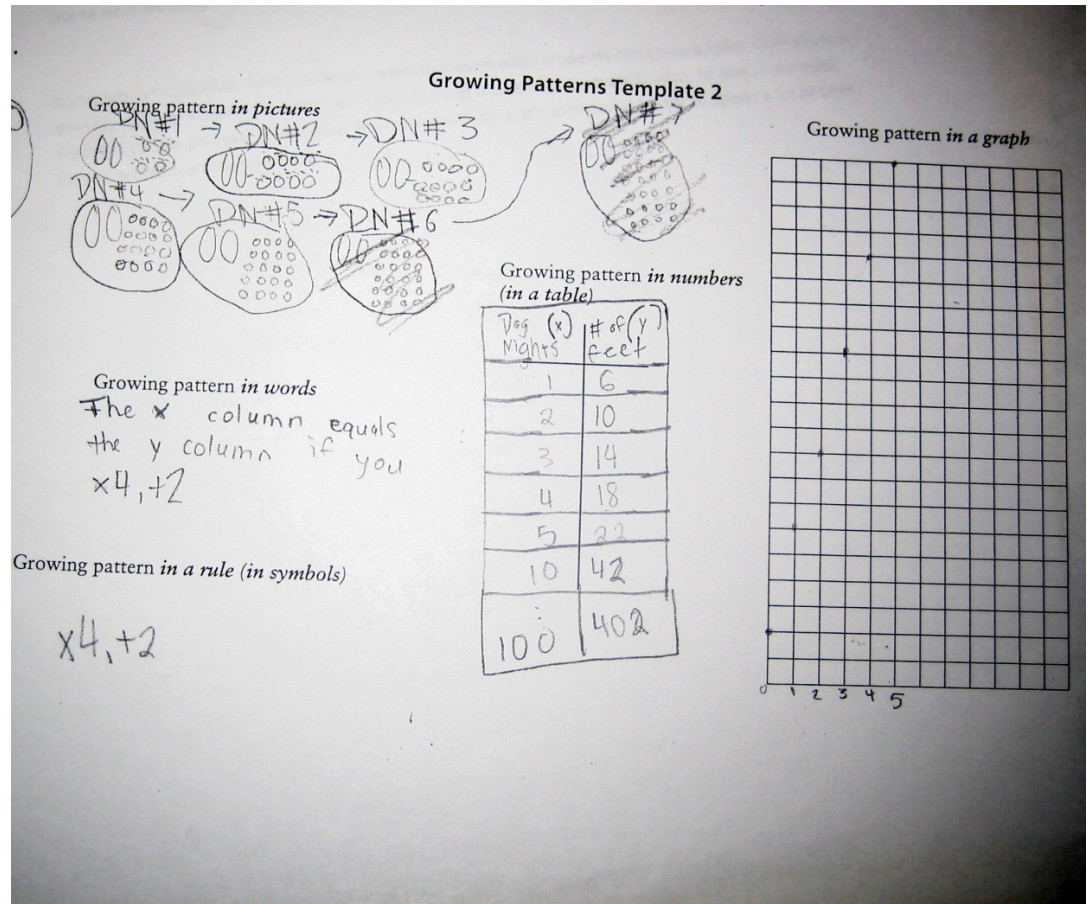
2) Debra blew out $\frac{3}{4}$ of the candles on her birthday cake. How many candles did she blow out? How old is Debra? (Write as many possible answers as you can think of.)

Portfolio Reflection

Why did you choose this piece?

The students enjoyed the read-aloud, and I've done another one since then as a nice change of pace. The activities took longer than anticipated, but I felt the students were getting value out of what they did. I felt the students were very engaged, and there was some really good discussion.

Some things I took away from this lesson were that even older students can enjoy a lower-level book in context with the lesson as they can be humorous and beautifully illustrated. Also, as one of my math methods college professors as well as the math coach said, it's sometimes better to spend a lot of time on one problem and delve into it.



Coaching Reflection

How has the coaching process impacted your practice of teaching and help you advance in your professional goal(s)?

I'm trying to put more responsibility on the students for the work that we do in math class. I'm working on developing more student self reliance. I'm also having students explain their thinking to a partner, to small groups, and to the whole class more often. Jessica has shared lessons with me which has supported me in continuing to use hands on activities to increase student engagement and to build conceptual knowledge. Using literature as a springboard was new to me, and I found that is was engaging and effective.

How has job embedded coaching helped your students as learners?

I think the students are excited and interested about what they might be doing in math each day. They do like to share their discoveries with each other, especially when they have an idea that is different from someone else's, but it is still right. I think they also like to have the power of input to the class.

What goals do you have for the immediate future?

My goal is to continue seeking out new ways to present lessons and for the students to explore math concepts.



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Coaching Reflection

What has been the most valuable part of the coaching process?

I would say that it forced me to stretch myself to try new ways of doing things. I felt validated that I could put more responsibility on the students and have them working and thinking harder. When students have to stretch their thinking and then can persist to solve a problem, it builds their confidence. It also validated some ideas that I already had about spending more time on topics when important learning is going on.

What would you change about this process?

I would like to have more easy access to open ended lesson plans.

Organization Support and Change

Organization Support and Change:

- Inclusion of coaching support for teachers
- Establishing relationship between teacher need as determined by teacher evaluation process and coaching
- Administrator involvement in professional development; their role and their support
- Scheduling adjustments for grade level planning, observations, and debriefing
- Support for additional instructional materials
- Analysis of data and determination of next steps

Teachers said these were important factors:

- Professional development that is relevant to personal and school goals 85%
- Effective and engaged principals and building-level leaders 91%

Primary Sources, 2012
Gates Foundation and Scholastic

Student Learning Outcomes

Student Learning Outcomes

- Benchmark testing
- District-reported data over time
- Classroom observation of student engagement, interactions, and explanations
- Collection and analysis of student work

Questions to guide the session:

- What is the need or problem?
- What's contributing to the need or problem?
- What will remedy the need?
- If PD, what will be the focus?
- What was learned?
- Was it implemented?
- Was the need impacted?

Reflecting on the Session

- What will you take from this session to help in your work of determining effectiveness of professional development?
- What other strategies would you suggest we use to determine effectiveness?



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