

#### **Mathematics Coaching Program**

Patti Brosnan Executive Director Azita Manouchehri Associate Director

Tim McKeny Associate Director Lucia LeFlevares Assistant Director



http://mcp-coaching.osu.edu

hio Department



### **Recruitment Agenda**

Welcome MCP Overview Student Mathematical Thinking Lunch Year 3 Coach Presentation Site Visitor Report **Program Assurances** Q & A Department





## What was she thinking?

#### The Problem:

There are 42 stamps to put in the stamp book. There are 7 pages in the stamp book. How many stamps can be on each page if all of the pages and all of the stamps are used and there are the same number of stamps on each page?

#### Given to a second grade student.





### **Interviewer Notes**

The student's responses to the stamp problem were documented as below. What is the student thinking?

Q.42/7 A:  $3 \times 4 = 12$ 12 + 2 = 14 $2 \times 7 = 14$ 4 + 2 = 6





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## Look at This!!

42/7	
A: 3 X 4 = 12	4 threes left over after the 7 from each 10 (in 40).
12 + 2 = 14	2 extra ones in 42, so 14 ones left over altogether.
2 X 7 = 14	There are 2 sevens in the left over 14, plus the 4 sevens from the 4 tens in step one.
4 + 2 = 6	That makes 6 sevens in 42!







# MCP Conceptual Framework

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#### **MCP** Conceptual Framework





# Our MCP Coaching Model







## We have <u>ONE</u> GOAL

We will work together to enact research-based ideas in YOUR classroom with YOUR kids using YOUR materials and YOUR curriculum to improve student learning and understanding of mathematics.





#### MCP Coaching Model Our Non-Negotiables

Full-time district hires, classroom-embedded professional development for all mathematics teachers, one coach per building.

Work with teachers intensively - daily with 4 teachers for 6 weeks, and then move on to another 4 teachers.

(cont.)





#### MCP Coaching Model Our Non-Negotiables (cont.)

Support teachers in learning mathematics content, pedagogy, and assessment strategies to meet students' diverse needs.

Team plan, team teach, debrief, re-plan, to create a data-based and student responsive pedagogy.

Honor confidentiality of all teacher and student data.





### **MCP Coaching Model**

# Getting started: Awareness session, recruiting volunteers

#### Working in the classroom:

4 teachers at a time, every day for 4-6 weeks, in the classroom.

Pre- and post- conferencing and team planning between the coach and the teacher.

Focus on student learning, data about student understanding, pedagogical choices, and mathematics content aligned with the ODE standards and the MCP framework.

This is not a pull-out program. Coaches are not substitute teachers; coaches are not modelers.





### MCP Teaching Approach

The MCP pedagogy is curriculum independent The pedagogy consists of:

Rich problems.

Allowing students to work freely.

Questioning, encouraging, facilitating discussions.

Documenting the on-going assessment.

Grounding instructional strategies on assessment.

Focus on student thinking.

Constant use of NCTM Process Standards and the Common Core State Standards Mathematical Practices.





Common Core State Standards Mathematical Practices Ohio's New Learning Standards

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Construct viable arguments and critique the reasoning of others
- Model with mathematics (cont.)





Common Core State Standards Mathematical Practices Ohio's New Learning Standards (cont.)

- Use appropriate tools strategically
- Attend to precision
- Look for and make use of structure
- Look for and express regularity in repeated reasoning







#### **Mathematics Coaching Preparation by Year**

Year 1	Learning as students. Content, thinking, learning. Learning as teachers. Content, student thinking, pedagogy. Learning as coaches. All of the above plus working with peers.
Year 2	Deeper Content Knowledge Conceptual & Procedural. Deeper Student Thinking Assessment. Deeper Learning, Pedagogy and Coaching.
Year 3	Advanced Coaching. Advanced Leadership. Independent Learning and Leading.





#### **Program Emphases by Year**









## **MCP Implementation Fidelity**

- Top 10 schools with highest gains.
- Bottom 10 schools with lowest gains.
- Coach reports, site visitor reports, facilitator reports.
- Student mathematics achievement gain scores.





## MCP Schools Having the Greatest Amount of Growth

- Strong alignment with MCP protocol
- **Strong leadership capabilities**
- Administrative support
- Knowledge of coaching, mathematics, and pedagogy
- Focus on MCP Instructional Principles





Coaching Characteristics Prevalent in the Most- and Lacking in the Least- Improved MCP Schools		
Leadership	<ul> <li>Consistent attendance and participation in PD sessions and small group meetings with MCP Facilitators.</li> <li>Willingness to promote expected role of coach in the school.</li> <li>Participation in other leadership roles within the school: Building Leadership Team; School Improvement Team; Intervention Assistance Team.</li> </ul>	

# **Coaching Characteristics Prevalent in the Most- and Lacking in the Least- Improved MCP Schools (cont.)**

Administrative Support	<ul> <li>Strong administrative support to implement the program.</li> <li>Principal understanding of MCP goals, approaches, and required aspects of coaching.</li> </ul>
Professional Knowledge and Coaching Role	<ul> <li>Average and above average measures on content, pedagogy</li> <li>High comfort level with the program.</li> <li>Analyzes student work and assessment data with teachers.</li> <li>Pursues implementing MCP coaching model.</li> </ul>
Focus on OMCP Instructional Principles	<ul> <li>Student thinking.</li> <li>Mathematical knowledge.</li> <li>Questioning techniques.</li> <li>Using process standards.</li> <li>Using rich problems.</li> </ul>



### **Roles of MCP Team Members**

- MCP Project Staff Facilitators Coaches Principals Teachers
- Site Visitors







# MCP Student Mathematical Thinking







## **Problem Sets**

- What are they?
- What is the purpose for using them?
- Administering the problem sets.
- The importance of documenting students' authentic responses.







# What Are the Problem Sets?

- Each set consists of five problems
- Each grade level has a specific problem set
- Each problem addresses one of the five content standards identified by NCTM and ODE
- Number and Number Sense
- Patterns, functions and Algebra
- Measurement
- Geometry and visualization
- Data analysis





## **Process Standards**

Each problem provides children an opportunity to demonstrate their proficiency with Process Standards identified by NCTM and ODE

Communication

Connection

Reasoning

Multiple representation

Problem solving







# What Is the Purpose for Using the Problem Sets?

- Provide informative qualitative information on children's problem solving skills.
- Provide evidence of the students' growth over time with an emphasis on the mathematical processes.
- Provide illustrations of authentic ways that children might solve problems and their thinking.
- They are equally as valuable to teachers.







# Administering the Problem Sets

Give students time to think about the problem and decide on a strategy they find useful.

Advise students to show all their work; recording only a final answer is not enough.

Reassure students that getting the "right" answer is not the focus of the task. (cont.)







# Administering the Problem Sets (cont.)

Neatness is not of importance; we learn from how children organize their ideas.

What we are interested in is learning HOW children solve problems in each area, the methods they use and how they communicate their ideas in writing.





## Why Authenticity of Students' Responses Is Crucial

They allow us to tell how students' mathematical processing changes over time.

They can greatly influence what they do in class and enhance student learning.





# **The Rope Problem**

Jessica needs to buy a rope for a school project. She needs lengths of one-fourth, three-fifths foot, and two-thirds foot. How much rope does she need in all?







## **Sample Response 1**

 Jessica needs to buy rope for a school project. She needs lengths of one-fourth foot, three-fifths foot, and two-thirds foot. How much rope does she need in all?





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## Sample Response 2

1. Jessica needs to buy rope for a school project. She needs lengths of one-fourth foot, three-fifths foot, and two-thirds foot. Jessica need to buy a school rope about like three fifthe foots long or two thirds and long she need to buy 5 ropes because eveny rope is about threefore seet long or two three feet long so she netal to buils -Ropes so lot of people can get in the rope so they can all be friends and all fett in the rope all together so 5 is how many ropes she have to buy.







## Sample Response 3

 Jessica needs to buy rope for a school project. She needs lengths of one-fourth foot, three-fifths foot, and two-thirds foot. How much rope does she need in all?

$$\frac{1}{4} + \frac{3}{5} + \frac{2}{3} = \frac{6}{60} + 6 = \frac{1}{10}$$





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### **Roles of MCP Team Members**

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- Teachers
- **Site Visitors**







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# Lunch Logistics







# Lunch!



# Travel Reimbursement Logistics





## Data Collection and Use in the Coaching Process

#### LAMP for teachers

Coaches trained in analysis – not scoring Confidentiality is key

#### LAMP for coaches

Analysis by selves and MCP

#### Coach and teacher work in schools

Site Visitor Reports





#### **Site Visitors**



### Kristi Graves

## Laurie Hunker









# **About the Site Visitors**

**Educational Background** 

#### **Experience in Education**

**Mathematics** 

**Curriculum & Instruction** 

Administration

Observation

#### **Involvement with MCP**







# **The Need for Site Visits**

#### **Qualitative Snap Shots**

Two from Site Visitors

**Two from Facilitators** 

Communication

Accountability







# **During the Site Visit**

#### Meeting with the Coach & Teacher

- Pre-conference
- **Classroom Observation**
- Post-conference

#### Meeting with the Principal

Informal Discussion about the MCP Partnership







## **Session Overview**

#### A Glimpse into the Data...

What are the common themes? How can we use the findings when planning for implementation?







# **Need for the Program**

#### Professional Development for the Coach

"Columbus is doing a great job preparing us to coach."

"The professional development from OSU and the support from facilitators and other people in the group has been phenomenal. This is more support than I have ever had in my previous years as a coach."





# **Need for the Program**

#### Professional Development for the Coach

"The knowledge [the coach] is bringing back from Columbus pd sessions is great."

Doing things I "haven't ever done or wouldn't have done if it wasn't for the MCP ways of teaching."

"My ways of teaching are changing and the student learning is changing. It is all positive."





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# **Professional Development**

#### School-wide

OAA, Scoring, Transitioning to PARCC, Transitioning to CCSS, Mathematical Practices, Adapt a Task, Article Discussions, Curriculum, Assessments, Data Analysis

#### Job-embedded Coaching (HQPD)

- "A little different in each room"
- "Different places in the process with different teachers."
- "With each teacher, there are important things to be working on."

#### A <u>DELICATE</u> Balance







# **Job-Embedded Coaching**

- **Pre-conferencing**
- **Modeling Specific Strategies**
- Co-teaching\*
- Debriefing







## An Evolution of Practices... Traditional Instruction

#### Structured

Limited Student Involvement

Page-by-Page

#### Limited Expectations for Learning Basic, Low-Level Problems Replication







# **Evolving Practices**

"Change is difficult. The longer you do something, the harder it is to change. He is very patient and gives us small bits at a time, encouraging us and celebrating our accomplishments without making us feel overwhelmed."





#### Evolving Practices: Embracing a Conceptual Approach

"I am seeing teachers moving from a pencil/paper rut. Teachers are comfortable with her [the coach], and feel safe asking her questions and trying new things."

Teachers are "seeing differences in providing content and students having a conceptual understanding."

"She was very traditional. She is now on board with the MCP way."





### "I use to do all of the work, now I am letting the students do the work and become engaged in their learning."

"My room is less teacher directed. I am using more hands-on. It takes more time, but in the end, the methods are far more effective and memorable."





## Alignment to the Mathematical Practices

1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
3	Construct viable arguments and critique the reasoning of others
4	Model with mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning





# Ex: Making sense of problems and persevering in solving them

"Kids are experiencing math, not hearing it."

Inquiry-based, Hands-on Manipulatives and Tools

"The kids are being challenged and that's how they learn."

"My thinking has changed. I can see that these strategies/practices are beginning to come out in all I do. It is so weird."







"I love the MCP way because when I grew up there was only one way to do math and that was the way the teacher taught it."

"No longer asking what is the answer to number one, number two but how did you get that... we are moving beyond having one possible solution."

"Present as many ways as you can."

"Can you show your work in another way?"





# Ex: Constructing viable arguments and critiquing the reasoning of others

"I am learning to ask more questions and let kids do the explaining."

"Students can explain better to each other and help each other. Students are able to own up to their answers and it is easier for them to remember" than when taught by the teacher.





## Incorporating the Process Standards: Reasoning

"There is no right or wrong way, as long as they can justify their thinking."

"How do you know?"

"Show us."

"Prove it."

"Convince me."

"I can prove you wrong!"







## **Making Connections**

- **Problem Solving**
- Thinking
- **Strategies**
- Representations
- Concepts
- Seeing the Big Picture, Overtime

"She can see the vertical alignment and build a continuum of learning in our building."







#### **Opening Doors**

"One teacher has him, and then everyone wants him."

"This has worked beautifully. Some have originally sought me out, and others by the word of mouth."

"The one teacher that is most outspoken in the building... one that would definitely not be for the MCP way... she has the most buy-on... the program has spoken for itself and the approach."







#### Ah-ha's on Strategies

"We are beginning to see a carryover of these principles into other subjects."

"Greater emphasis is being placed on the process."

"When teachers come back to you, and are still talking the talk, and doing stuff even when I'm not there."







#### **Increased Expectations**

"At first, students were frustrated because no one was going to help them, or give them the answer. Now it has evolved into students thinking outside the box, using a variety of strategies building confidence levels"

Moving from an "I can't to a yes, you can" culture.







#### Student Engagement/Excitement

- Students who "normally won't talk, speak up."
- "Drag them from math"
- "Just five more minutes"
- "Attitudes turn around"
- Fewer discipline issues







# **Greatest Challenges/Barriers**

#### **Role Perceptions**

Need for Clearly Communicating and Implementing Roles Aligned with the Position

#### Assignments

"too many hats," "spread a little thin" Coaches "need to be in <u>one</u> building."







## **Greatest Challenges/Barriers**

#### Time

Planning & Debriefing

### Scheduling

"Everyone has math at the same time in the building."

"Schedules had already been developed. And, many teachers were teaching math at the same time. And, they didn't want to change their schedule for the year."







# The Power of The Program

#### From Implementing to Advocating...

"I hope to continue the program. If they had taught math like this when I was a student, I would have liked it more."

"MCP is not just a luxury, but a necessity."

"Every teacher needs a coach."







## **ODE/MCP** Assurances

#### Ann Carlson, ODE









# **Questions?**



