

# Contributing to a Culture of Coaching for Mathematical Practices

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# Research Contributors

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# Welcome!

In this session, you will learn about:

- a definition of a mathematics coach;
- the multiple roles of a mathematics coach;
- characteristics of a coach;
- the instructional coaching cycle; and
- setting expectations to create a culture of coaching for your school.



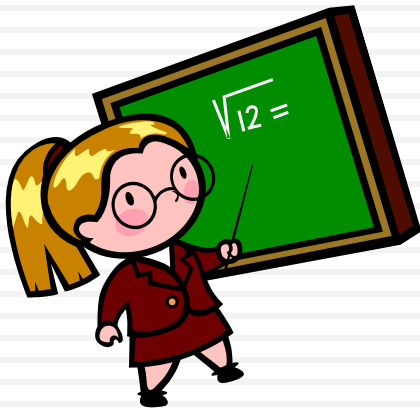
# Introductions



- Pair up with someone, preferably someone you do not know yet.
- Spend **two** minutes introducing yourselves to each other. Jot down notes if you want.
  - Name
  - School & Grade Level(s)
  - Something that probably makes this person unique in this room
- (If in a workshop setting) When the two minutes are up, introduce your partner to the full group.

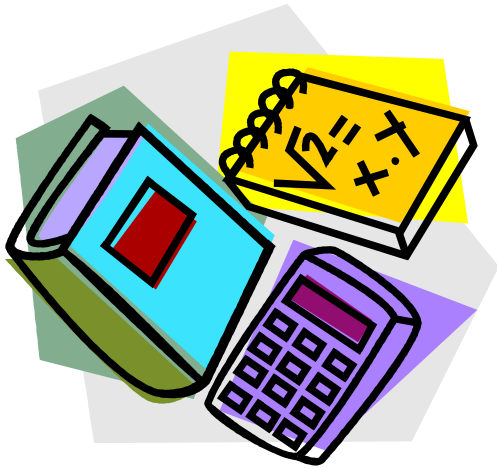


# Rationale and Coaching Roles



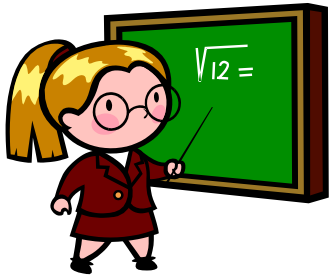
# MATHEMATICS COACHING

Mathematics classroom coaching is gaining popularity as a school-based effort to increase teacher effectiveness and student achievement.



# MATHEMATICS COACHING

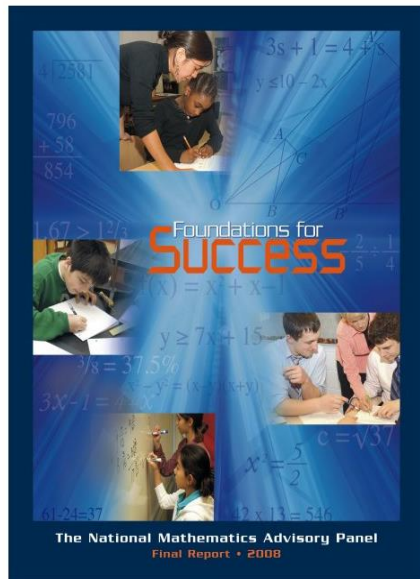
- Coaching is a promising model for enhancing K-8 mathematics teachers' abilities to provide quality mathematics education.
- Coaching can be implemented at any point in a teacher's career (as opposed to mentoring).



# MATHEMATICS COACHING

The National Mathematics Panel (2008) reports that schools across the nation are using mathematics specialists, including mathematics coaches.

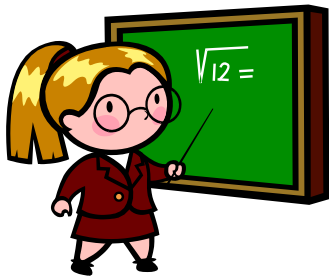
What makes for effective coaching in mathematics is being researched at various sites across the United States.





# MATHEMATICS COACHING

- Studies are demonstrating what types and depths of knowledge effective mathematics coaches hold.
- Implementing mathematics coaching involves cost and logistical effort for schools and districts.



# MATHEMATICS COACHING DEFINED



How do you define “**coaching**?”

What images and phrases come to mind when you think of a **coach**?

Reflect for a few minutes...list your ideas... then we'll share thoughts as a group.

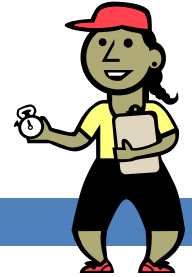
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Coaches have many names...  
...and many responsibilities.



# Ten Roles for Coaches

(Killion, 2009)



- Data coach
- Resource provider
- Mentor
- Curriculum specialist
- Instructional specialist
- Classroom supporter
- Learning facilitator
- School leader
- Catalyst for change
- Learner

Underneath the titles and tasks,  
there are certain characteristics  
that are shared by all good  
coaches.

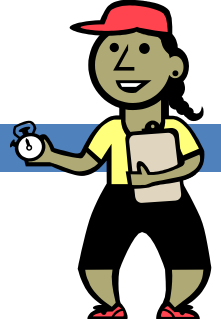


# Characteristics of a Coach



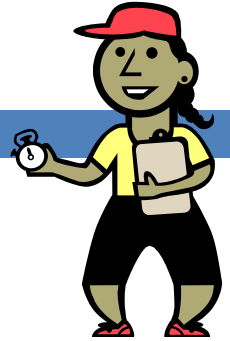
- Stands alongside teacher.
- Doesn't do the work for teacher.
- Supports teaching efforts, even if he/she is not necessarily an “expert.”
- Knowledgeable of classroom situation, its challenges and how to overcome them.

# What teachers **appreciate** about coaches . . .



- Oversight of curriculum fidelity and pacing
- Gathering, analyzing, and sharing data
- Finding resources and answering questions
- Team building and facilitating discussion
- Helping with parents, resources, administration
- Reducing the workload

# What teachers **desire** from coaches . . .



- One-on-one work
- Observation and feedback
- More observation and feedback
- Modeling lessons and strategies
- Help with: differentiation, cultural relevance, student engagement, assessment

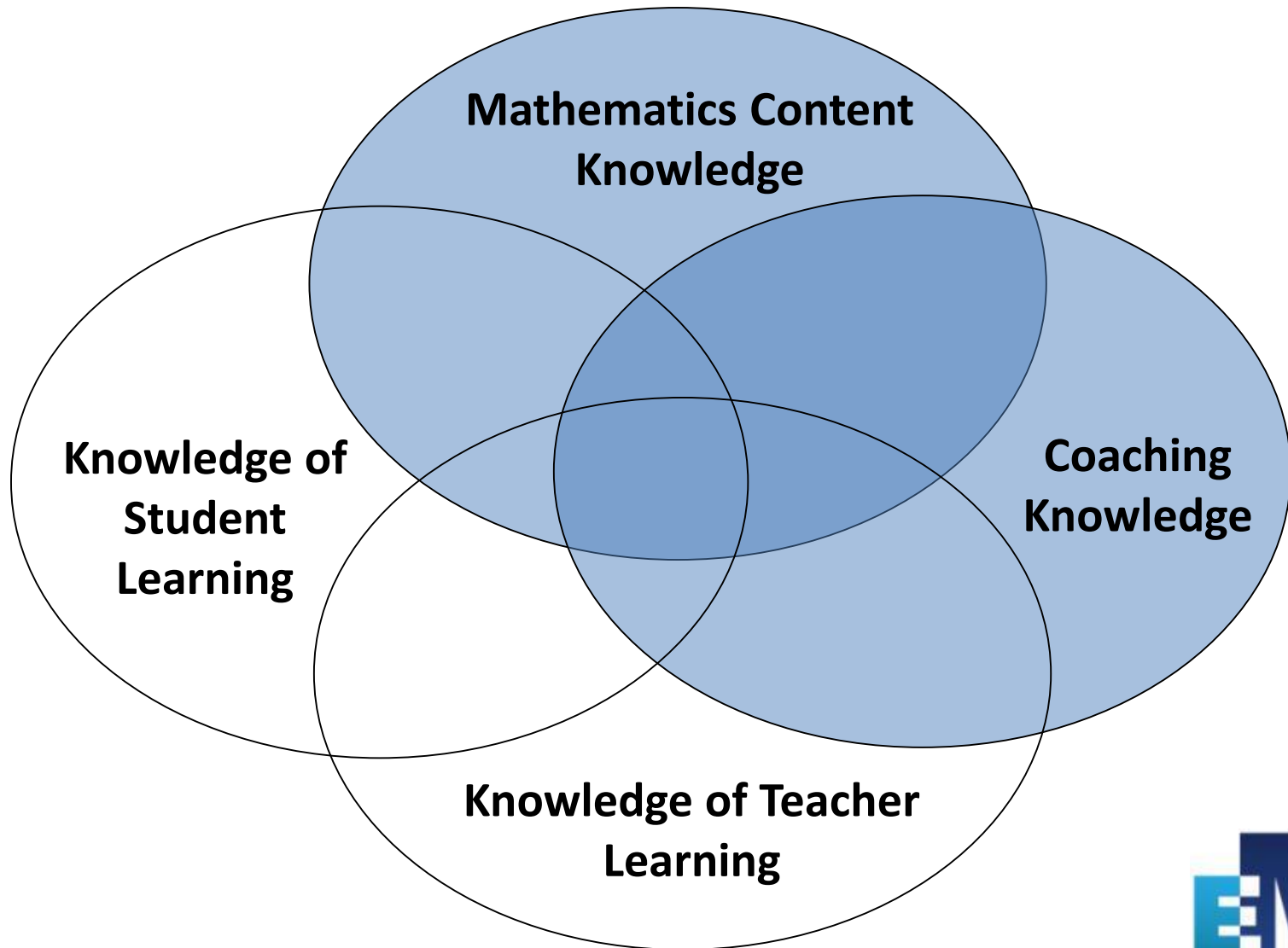


# MATHEMATICS COACHING DEFINED

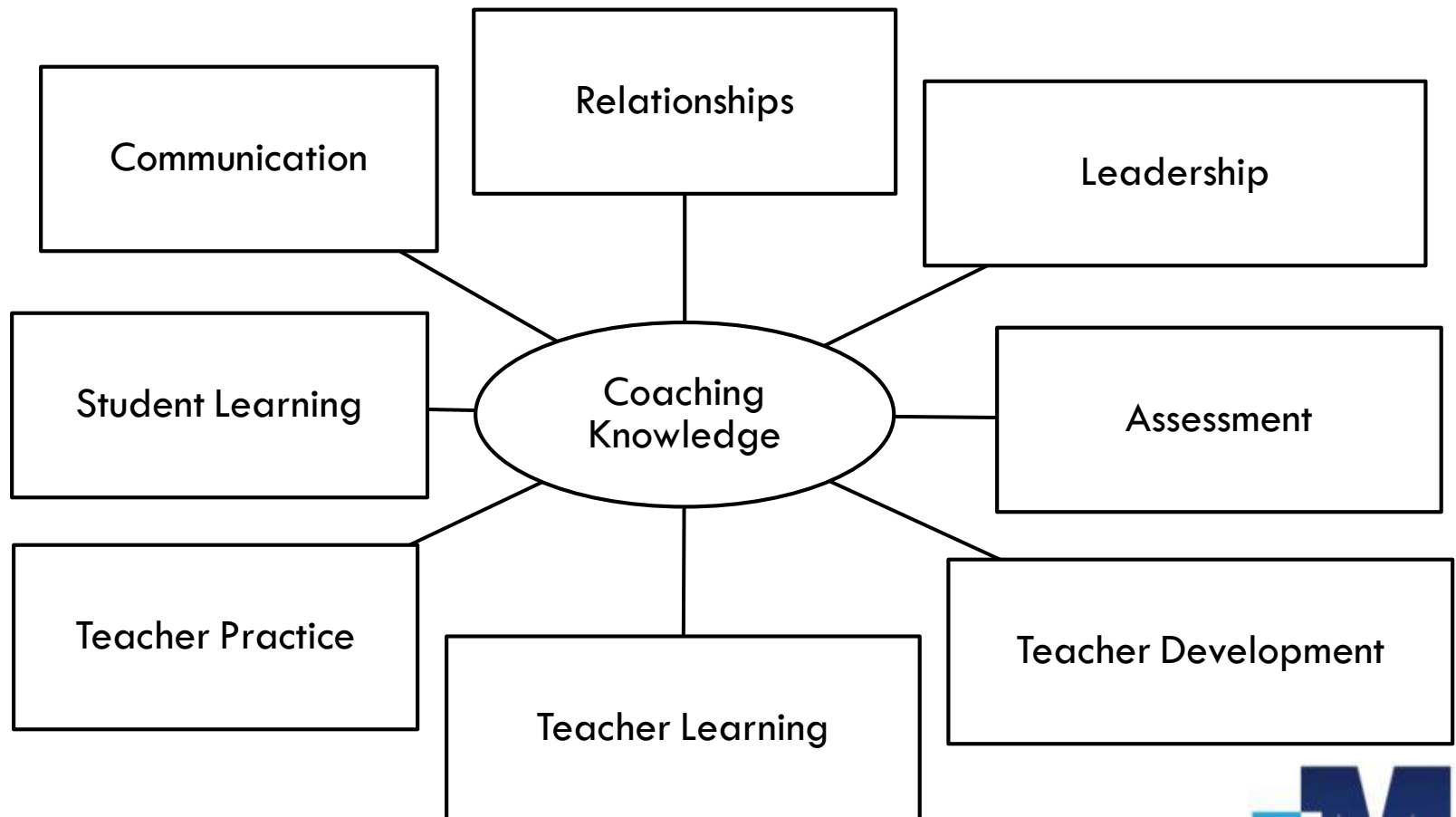
A mathematics coach is an **on-site professional developer** who enhances teacher quality through **collaboration** focusing on **research-based, reform-based, and standards-based instructional strategies** and **mathematics content** that includes the **why, what, and how** of teaching mathematics.



# COACHING KNOWLEDGE DOMAINS



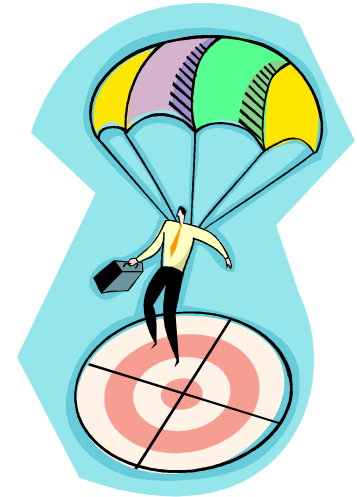
# Coaches know about mathematics content and . . .



# EFFECTIVE COACHING PRACTICE

A coach should:

- ☐ Ask reflective questions
- ☐ Provide feedback
- ☐ Share materials and resources
- ☐ Maintain confidentiality



# EFFECTIVE COACHING PRACTICE

A coach should use a coaching cycle:

- ▣ Gather information before the lesson
- ▣ Observe a complete lesson
- ▣ Collect and document evidence
- ▣ Debrief and reflect after the lesson



# BOUNDARIES OF COACHING

A coach generally does not:

- ☐ Evaluate teachers.
- ☐ Take over during a lesson.
- ☐ Impose specific lessons or instructional strategies.
- ☐ Tutor struggling students.
- ☐ Perform the support services of an aide.

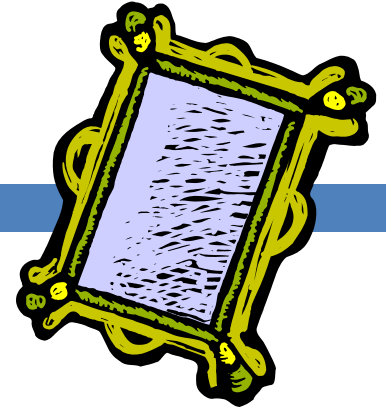
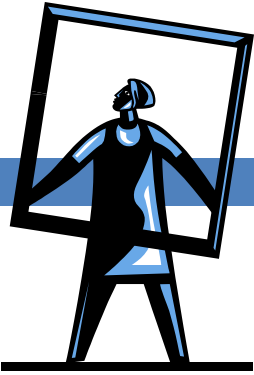


# To make the most of coaching...

- ...focus on instructional issues.
- ...focus on mathematics content.
- ...follow a coaching framework.
- ...follow a coaching schedule.
- ...work collaboratively with your teachers and school administrator(s).



# WHAT'S MISSING FROM THE PICTURE?

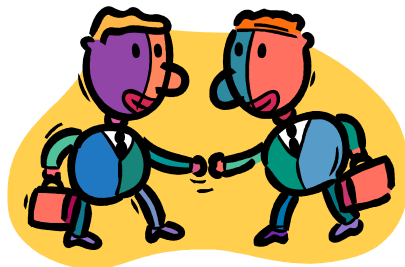


- The coach is not the only one responsible for **partnership, relationship, and collaboration.**
- Coaches are only as effective as their teachers will allow.



# COMPLEXITY OF COACHING

- Coaching is a collaborative process that is done with teachers, not to teachers.
- Coaching is a joint effort from both the coach and the teacher(s) involved.
- Coaching support is useful only if the teacher and coach are prepared, and willing to listen, internalize, and respond accordingly.





# BECOMING CONSUMERS OF COACHING

A commitment to creating a collaborative and rewarding coaching relationship will help maximize the benefits of coaching.

- A wise consumer of coaching makes the most of this educational investment.
- Consumer of coaching addresses the teacher's role in coaching process.

# BECOMING CONSUMERS OF COACHING



Discuss with a neighbor:

***What might be the expectations  
from teachers  
who are being coached  
in order  
to make coaching  
effective and collaborative?***

# CONSUMER OF COACHING FRAMEWORK

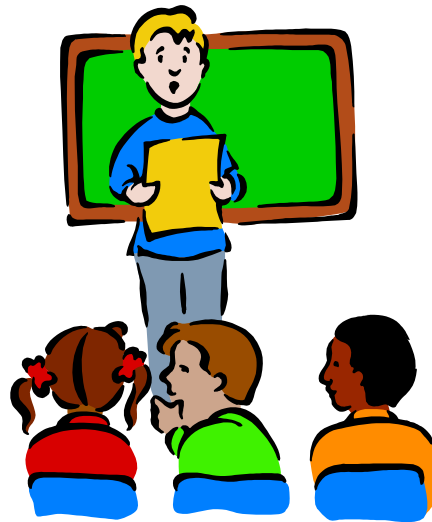


- ☐ Feedback
- ☐ Reflection
- ☐ Classroom expectations
- ☐ Content
- ☐ Structure
- ☐ Communicating needs

# FEEDBACK

Effective coaching requires feedback.

*An effective consumer of coaching  
asks the coach for targeted feedback.*



# REFLECTION

Coaching is a reflective process.

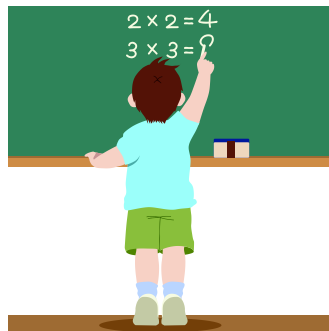
*An effective consumer of coaching  
is open to reflection and is an active participant in the  
reflective process.*



# CLASSROOM EXPECTATIONS

Effective coaching requires teachers to communicate their expectations for coaches as the lesson transpires.

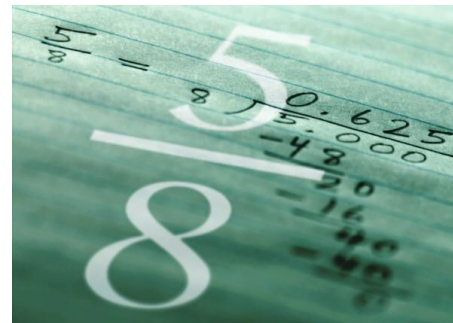
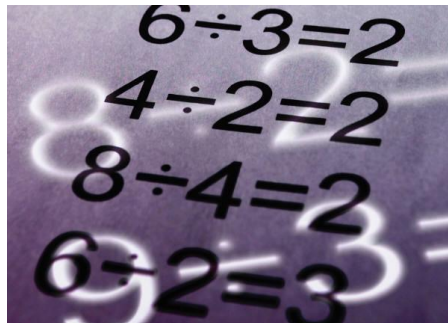
*An effective consumer of coaching tells their coach what kind of classroom interaction he/she desires.*



# CONTENT

Effective coaching is content-based.

*An effective consumer of coaching  
is willing to examine her or his own mathematics content  
knowledge.*



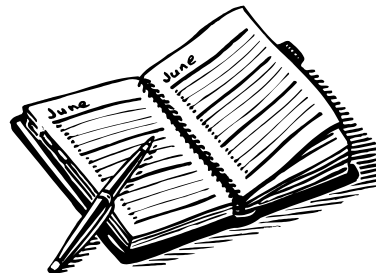


# STRUCTURE

Effective coaching is structured and involves at least three components:

a pre-lesson conference, a lesson observation, and a post-lesson conference.

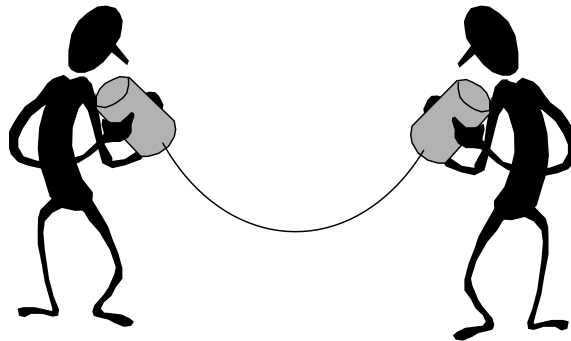
*Effective consumers of coaching  
help coaches schedule the 3-part cycle.*



# COMMUNICATING NEEDS

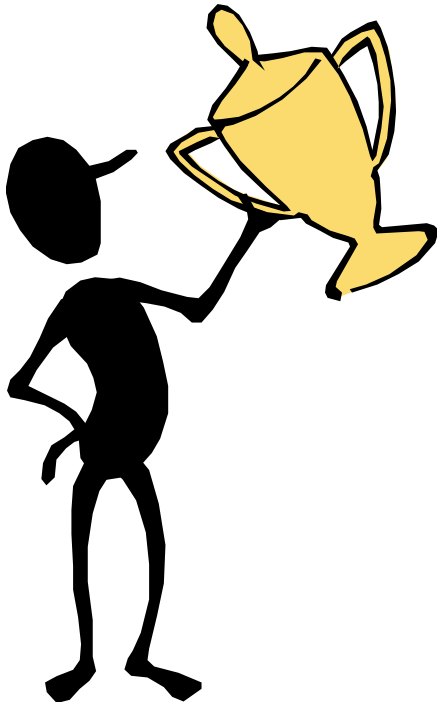
Effective coaching requires teachers to communicate their needs.

*An effective consumer of coaching tells the coach what he/she needs.*



# CONSUMERS OF COACHING ARE ABLE TO:

- ☐ assess their own needs;
- ☐ assess their performance;
- ☐ ask for help from others;
- ☐ provide context as needed;
- ☐ listen to and hear ideas;
- ☐ overcome anxious feelings;
- ☐ assess and communicate needs;
- ☐ assist in scheduling.



# Coaches and Administrator

Coaches and teachers need to keep administrators informed of their activities and help them identify ways to be supportive.

**How can coaches and administrators (and other school personnel) support each other in the mathematics coaching process?**



# Administrator Support



- Acknowledge the significance and value of coaching to improved practice and student learning.
  - ▣ Advocate to the school community for coaching as a professional learning model.
- Support time commitment for coaching.
  - ▣ Ask about progress and what each are learning, in general terms.
- Communicate clear expectations to everyone for shared responsibilities.
  - ▣ Cultivate a positive, productive relationship among teachers and coaches

# Culture of Coaching

School Leaders	Mathematics Coach	Teacher
<ul style="list-style-type: none"> <li>• <b>Commit to implement coaching as a professional development model</b></li> <li>• <b>Set aside time for coaching within the daily schedule</b></li> <li>• <b>Share goals and beliefs of coaching to entire school</b></li> <li>• <b>Articulate clear expectations for coaching</b></li> <li>• <b>Budget appropriate resources (time and personnel) to support coaching</b></li> <li>• <b>Make mathematics coaching a priority</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Ask reflective questions of teachers</b></li> <li>• <b>Provide feedback to teachers</b></li> <li>• <b>Share instructional materials and resources</b></li> <li>• <b>Maintain confidentiality with teachers about coaching sessions</b></li> <li>• <b>Use a structured approach for coaching:</b> <ul style="list-style-type: none"> <li>○ <b>Gather information before the lesson</b></li> <li>○ <b>Observe complete lesson</b></li> <li>○ <b>Collect and document evidence from lesson</b></li> <li>○ <b>Debrief and reflect with teacher after lesson</b></li> </ul> </li> <li>• <b>Be flexible and dependable</b></li> <li>• <b>Make mathematics coaching a priority</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Communicate specific instructional needs to coach</b></li> <li>• <b>Ask for specific types of support from the coach</b></li> <li>• <b>Listen to hear ideas being presented</b></li> <li>• <b>Take shared responsibility for cultivating a positive and productive coaching relationship</b></li> <li>• <b>Set aside appropriate amount of time for coaching sessions</b></li> <li>• <b>Be open to try new instructional practices</b></li> <li>• <b>Make mathematics coaching a priority</b></li> </ul>

# Coaching and Mathematical Practices – An Example

$$\int \frac{x+5}{x^2-2x-3} dx$$
$$\frac{x+5}{x^2-2x-3} = \frac{2}{3} \frac{1}{x-3} + \frac{1}{3} \frac{1}{x+1}$$
$$= \frac{2}{3} \ln|x-3| + \frac{1}{3} \ln|x+1|$$
$$= \ln \frac{(x-3)^2}{x+1} + C$$

- Match vignettes to math practice (no large group discussion on placement) - Matching cards to SMP
- Design chart for SMP
  - ▣ Teacher action
  - ▣ Student action
  - ▣ Growth mindset
- Carousel walk to add perspectives or ask questions to clarify

# Posting Mathematical Practices

## #3. Construct viable arguments and Critique the reasoning of others.

### Teacher:

- ask clarification questions
- require explanation & justification
- select appropriate problem that will create the desired discussion
- Clear and consistent academic vocabulary

### Student:

- disagree appropriately
- listen to others' arguments before responding
- successfully restate and "add on"
- make conjectures

### Evidence:

- accepting peer correction
- compare efficiency of solutions
- be able to explain someone else's solution
- determine other situations that might apply

## #3. Construct viable arguments and Critique the reasoning of others.

### Teacher:

- ask clarification questions
  - require explanation & justification
  - select appropriate problem that will create the desired discussion
  - Clear and consistent academic vocabulary
    - direct modeling of how to argue/critique
    - use talk moves
- Create a safe caring classroom environment

### Student:

- disagree appropriately 😊
- listen to others' arguments before responding
- successfully restate and "add on" 😊
- make conjectures

### Evidence:

- accepting peer correction 😊
- compare efficiency of solutions
- be able to explain someone else's solution 😊
- determine other situations that might apply



# Posting Mathematical Practices

6. Attend to precision		
Teacher	Student	Mindset
<ul style="list-style-type: none"> <li>• model precisely</li> <li>• encourage &amp; expect class discussions including routines for respectful disagreement</li> <li>• math word wall use</li> <li>• trial &amp; error activities</li> <li>• high expectations for student work</li> </ul>	<ul style="list-style-type: none"> <li>• use clear definitions when speaking &amp; writing</li> <li>• use appropriate symbols</li> <li>• accurate use of measures, labels, &amp; symbols</li> <li>• show multiple representations</li> <li>• careful formulated explanations</li> <li>• calculate accurately</li> </ul>	<ul style="list-style-type: none"> <li>• students willing to take risks and share thinking</li> <li>• willing to share what didn't work</li> <li>• perseverance</li> <li>• willing to re-do work or keep working</li> <li>• show multiple representation</li> </ul>

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# Posting Mathematical Practices

## 7 Look for and make use of Structure

### Teacher

- select worthwhile appropriate problem situations
- model numeric concepts geometrically
- provide manipulatives
- time to think/explore talk
- encourage explanation
- opportunities to collaborate
- present slight variations of an initial problem
- recognize students' prior knowledge

### Student

- try multiple strategies
- perseverance
- test hypotheses
- think flexibly
- model with appropriate tools
- build on prior knowledge
- collaboration
- explaining/demonstrating

### Growth Mindset

- trying multiple strategies
- testing out hypotheses
- persevering
- explanation

## 7 Look for and make use of Structure

### Teacher

- select worthwhile appropriate problem situations
- model numeric concepts geometrically
- provide manipulatives
- time to think/explore talk
- encourage explanation
- opportunities to collaborate
- present slight variations of an initial problem
- recognize students' prior knowledge
- think aloud mathematical connections

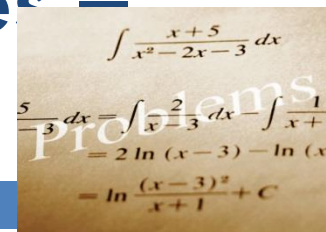
### Student

- try multiple strategies
- perseverance
- test hypotheses
- think flexibly
- model with appropriate tools
- build on prior knowledge
- collaboration
- explaining/demonstrating

### Growth Mindset

- trying multiple strategies
- testing out hypotheses
- persevering
- explanation

# Coaching and Mathematical Practices – An Example



Handwritten mathematical work showing the integration of a rational function using partial fractions. The work is on a piece of paper with the word "Problems" written vertically on the left side. The steps shown are:

$$\int \frac{x+5}{x^2-2x-3} dx$$
$$\frac{5}{3} dx = \int \frac{2}{x-3} dx - \int \frac{1}{x+1} dx$$
$$= 2 \ln(x-3) - \ln(x+1) + C$$

- Videos -- talk about SMP #4 (model)
- EDC descriptions for SMP
  - ▣ Tool: Student “look for” card
  - ▣ Rubric for SMP implementation
- Design chart for SMP
- Revisit vignette cards for placement
- Large group discussion



# We appreciate you joining us today!



# Thank you!

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