Coaches Need Professional Development, Too!

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Table Activity: Introductions

At your table, introduce yourselves to one another.

- Describe your responsibilities as a coach in your school or district.
- What common responsibilities do you share with one another?

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

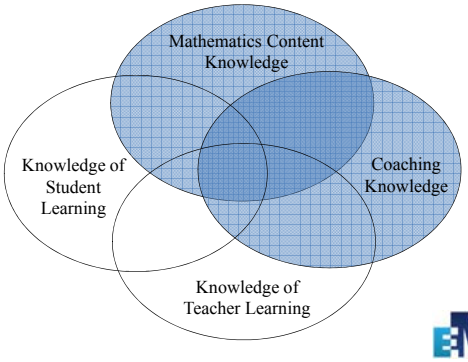
Mathematics Coach: EMC Definition

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 include
the **why, what, and how** of teaching mathematics.

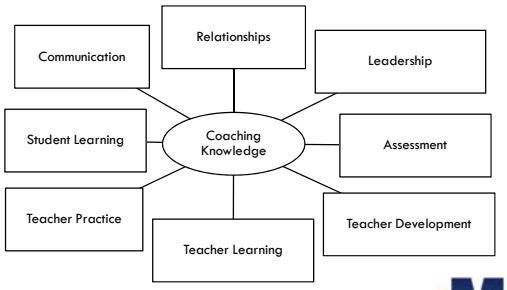
EMC Project Description

EMC is a 5-year
research and development project
examining the effects of a coach's
knowledge for coaching on a diverse
population of K-8 teachers.

Knowledge Domains



Coaching Knowledge



Professional Development

Two one-week professional development courses:

- **Knowledge of mathematics content,** specifically in the area of number and operation, with a focus on ratio and proportion.
- **Coaching knowledge,** addressing eight themes identified by coaching experts.

Mathematics Content

Mathematics Content Topics

Monday	Tuesday	Wednesday	Thursday	Friday
Focus on Mathematical Practice and Number Sense	Computation	Fraction Concepts	Fraction Operations and Ratios	Proportional Reasoning and Percent

Mathematical Practice and Number Sense

- Standards for Mathematical Practice describe ways teachers and learners engage with mathematics content.
- It is important to select appropriate representations of numbers or numerical problems based on context
- Factorization, divisibility, and divisibility rules are based on mathematical structure.

Number Sense Activity (Example)

Here are several pairs of multiplication calculations.

What pattern do you notice when you find the products?

24	27	35	42	56	32	156	144
×9	×8	×18	×15	×12	×21	×12	×13

Explain why, in each case, the products are the same.

Write another pair of multiplication problems with the same product.

Computation

- The properties of numbers and operations on numbers create structure that underlies computational methods, including algorithms.
- Multiplicative thinking is a skill to develop with all students.
- Models can be used to solve contextual problems, decide what operation is involved, and give meaning to number sentences.

Fraction Concepts

- Unitizing is the basis for fraction understanding.
- There are various models for representing fractions and these complement each other and enrich the meaning of fractions.

Fraction Operations and Ratios

- Models for fractions and their operations reveal structure that underlies computational methods.
- Various mathematical connections link ratios and fractions.

Multiplication or Division

Which of the following problems are solved by:

1¾ ½ OR 1¾ ½ ?

1. How many cups of sugar do you need to make a half batch of cookies if a full batch takes 1¾ cups of sugar?
2. How many posters can you paint with 1¾ cans of paint if one poster takes ½ can of paint?
3. How many pounds of birdseed do you need to fill a bird feeder if 1¾ pounds of birdseed fills the bird feeder ½ full?
4. What is the area, in square yards, of a rectangular garden that is 1¾ yards long by ½ yard wide?
5. How many servings of lemonade can you make if you have 1¾ cups of lemonade and a serving is ½ cup?

Proportional Reasoning and Percent

- Multiplicative reasoning is a fundamental component of proportional reasoning.
- Proportional situations can be represented by a variety of models, and certain models promote sense-making in solving proportions.

Coaching Knowledge PD

Week-long Theme

- Teaching coaches to recognize standards-based mathematics
- Standards-based mathematics develops mathematical processes, mathematical practices, and mathematical strands of proficiency.

Coaching Knowledge Topics

Monday	Tuesday	Wednesday	Thursday	Friday
Teacher Learning	**Student Learning & Teacher Practices I**	**Communication for Coaching**	**Teacher Practices & Student Learning II**	**Logistics of Coaching**
Themes: Teacher Learning and Teacher Development	*Themes: Teacher Practice and Student Learning*	*Themes: Communication and Assessment*	*Themes: Teacher Practice and Student Learning*	*Themes: Relationships and Leadership*

Teacher Learning & Teacher Development

Teacher Learning

- Engaging teachers in the coaching process
- How teachers in general acquire knowledge of content, pedagogy, and pedagogical content
- How individual teachers best acquire knowledge
- The discrepancy between "vision and practice"

Teacher Development

- Teacher development in content, pedagogy, beliefs, and management
- How to support individual teachers' development
- Teachers' motivations and barriers for learning

Example Activity: Teacher Development

Use this video clip to decide what you could discuss with the teacher in a conference, based on what you notice the most. Be prepared to give a rationale.

- Mathematics content?
- Communication?
- General pedagogy?
- Something else?

Student Learning & Teacher Practice

Student Learning

- A coach knows how to support teachers in applying mathematical processes (discourse, exploration, engagement) to classroom.
- A coach has knowledge to help teachers manage the learning environment and improve student learning.

Teacher Practice

- A coach knows how to discern teacher beliefs.
- A coach has a depth and breadth of knowledge of teaching research and teaching actions.

Scenario: Student Engagement

Roles

- Participant **B** is **Coach.**
- Participant **C** is **Teacher.**
- Participant **A** is **Observer.**

Process

- Individual prep (quiet time): 5 minutes
- Role play: 5 minutes
- Debrief: 15 minutes
  - 1st: Observer
  - 2nd: Teacher
  - 3rd: Coach
- Large group discussion: 5–10 minutes

Assessment & Communication

Assessment

- Assess teacher needs and use that assessment to set goals for coaching
- Assess student thinking and use that to set goals for coaching
- Help the teachers know how to use assessment in their classrooms

Communication

- Communicate professionally about students, curriculum, and classroom practice
- Mediate a conversation, by pausing, paraphrasing, probing, inquiring, and asking reflective questions
- Use nonverbal communication and listen actively
- Communicate in problem-resolving conversations

Example Activity: Communication

- Take a moment to review the pre-conference viewing guide.
- As the video plays, take notes on your observation guide and transcripts.
- Use the transcripts to make notes of specific examples of coaching moves.

Relationships & Leadership

Relationships

- The purpose of the relationship is to support teaching and content
- Communicate in a way that establishes trust, rapport, and credibility
- Establish positive inter-personal environments
- Foster relationships that respect various cultural influences (socio-cultural, school/district, and authority-autonomy)

Leadership

- Be strategic about setting goals and objectives for teachers and students
- Use, evaluate, and influence the school's vision
- Evaluate the utility of educational policies
- How to address challenges
- The coaching process

Activity: Coaching Heavy or Coaching Light?

- Read pages 21-26: Coaching Heavy or Coaching Light.
- Identify the one or two ideas that can help you as you think about your own role in the coming years.
- Walk and talk with a partner. Return at the specified time.

Tools to Support Coaching

The Examining Mathematics Coaching (EMC) project has developed and refined tools to help coaches and teachers in the coaching process.

- Coaching Skills Inventory
- Teacher Needs Inventory
- Reflections (Coach and Teacher)

EMC Teacher Needs Inventory

…is designed to help the teacher take ownership of the coaching process.

The responses are used by the coach as a tool to help focus the coaching and increase effectiveness.

EMC Teacher Needs Inventory

Areas explored include:

- Teaching conceptual/inquiry-based lessons
- Classroom environment
- Conceptual understanding of mathematics
- Mathematics content knowledge
- Classroom management

EMC Teacher Needs Inventory

IV. MATHEMATICS CONTENT KNOWLEDGE	Not at all Confident 1	2	3	4	Very Confident 5	Regarding this topic, ... I would not like to partner with my coach.	I'm not sure I would like to partner with my coach.	I would like to partner with my coach.
15. How confident are you with the mathematics you teach?	O	O	O	O	O	O	O	O
16. How confident are you with the mathematics beyond the mathematics that you teach, meaning the next grade level?	O	O	O	O	O	O	O	O
17. How confident do you feel planning lessons that include fraction concepts?	O	O	O	O	O	O	O	O
18. How confident do you feel planning lessons that include number sense and operations?	O	O	O	O	O	O	O	O

Teacher Needs Inventory

How confident do you feel using cooperative learning?

Not at all confident 1	2	3	4	Very confident 5

I would not like to partner with coach on this topic.	Not sure if I would like to partner with coach on this topic.	I would like to partner with coach on this topic.
[ ]	[ ]	[ ]

Assessing Teacher Need: TNI

- Analyze the TNIs for patterns in the teachers' responses.
- What information can you glean that might guide your coaching conversations?

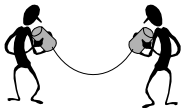
Becoming Consumers of Coaching

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

Communicating Needs

- Effective coaching requires teachers to communicate their needs.

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



Consumer of Coaching Framework

How to be a Wise Consumer of Coaching
(Journal of Staff Development, February 2011)

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

THANK YOU!

EMC
EXAMINING MATHEMATICS COACHING

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Web: www.math.montana.edu/~emc/

Here are several pairs of multiplication calculations.

What pattern do you notice when you find the products?

24	27	35	42	56	32	156	144
×9	×8	×18	×15	×12	×21	×12	×13

Multiply or Divide

Which of the following problems are solved by:

$1\frac{3}{4} \times \frac{1}{2}$ <u>or</u> $1\frac{3}{4} \div \frac{1}{2}$?

1. How many cups of sugar do you need to make a half batch of cookies if a full batch takes $1\frac{3}{4}$ cups of sugar?

2. How many posters can you paint with $1\frac{3}{4}$ cans of paint if one poster takes $\frac{1}{2}$ can of paint?

3. How many pounds of birdseed do you need to fill a bird feeder if $1\frac{3}{4}$ pounds of birdseed fills the bird feeder $\frac{1}{2}$ full?

4. What is the area, in square yards, of a rectangular garden that is $1\frac{3}{4}$ yards long by $\frac{1}{2}$ yard wide?

5. How many servings of lemonade can you make if you have $1\frac{3}{4}$ cups of lemonade and a serving is $\frac{1}{2}$ cup?

EXAMINING MATHEMATICS COACHING

EMC Teacher Needs Inventory: Example Coach Report for TEACHER 1

Teacher Last Name: **Teacher 1**
First Name:
Coach:
School:
Grade(s):
Date Taken:

KEY: Teachers rated the following 21 questions on **a scale from 1 to 5, with 1 meaning *not at all confident* and 5 meaning *very confident*.** Teachers then indicated whether or not they would like to partner with their coach on the particular topic, or that they are unsure.

I. TEACHING CONCEPTUAL AND INQUIRY-BASED LESSONS

1. How confident do you feel incorporating investigative, inquiry-based or discovery-based mathematics learning into your lessons?
1 ... I WOULD like to be coached

2. How confident do you feel using instructional strategies that are likely to increase students' mathematical conceptual understanding or problem-solving abilities?
2 ... I WOULD like to be coached

3. How confident do you feel engaging students in mathematical abstraction and sense-making (including symbol use, theory building, and justification and reasoning)?
2 ... I WOULD like to be coached

4. How confident do you feel using cooperative learning?
3 ... I'm NOT SURE if I would like to be coached

II. CLASSROOM ENVIRONMENT

5. How confident do you feel about "reading" or detecting students' level of mathematical understanding?
4 ... I WOULD NOT like to be coached

6. How confident do you feel using strategies to increase student collaboration or dialogue among students?
1 ... I WOULD like to be coached

7. How confident do you feel creating an environment where students listen to one another?
5 ... I WOULD NOT like to be coached

8. How confident do you feel encouraging intellectual rigor, constructive criticism or challenging of ideas?
3 ... I WOULD like to be coached

III. CONCEPTUAL UNDERSTANDING OF MATHEMATICS

9. How confident are you with the mathematical reasoning behind the mathematics you teach – meaning the understanding of *why* we teach it, *how* it relates to other mathematics topics, and *why* it is valid?
4 ... I'm NOT SURE if I would like to be coached

10. How confident do you feel creating and teaching mathematical applications and connections to other areas of mathematics?
3 ... I WOULD NOT like to be coached

11. How confident do you feel planning lessons that include mathematical conceptual understanding?
3 ... I'm NOT SURE if I would like to be coached

12. How confident do you feel planning lessons that include genuine mathematical problem-solving?
3 ... I'm NOT SURE if I would like to be coached

13. How confident do you feel planning lessons that include proportional reasoning?
3 ... I'm NOT SURE if I would like to be coached

14. How confident do you feel using questioning strategies such as higher-order questioning and wait time in the context of mathematics instruction?
1 ... I WOULD like to be coached

IV. MATHEMATICS CONTENT KNOWLEDGE

15. How confident are you with the mathematics that you teach?
4 ... I WOULD NOT like to be coached

16. How confident are you with the mathematics beyond the mathematics that you teach, meaning the next grade level?
3 ... I WOULD NOT like to be coached

17. How confident do you feel planning lessons that include fraction concepts?
2 ... I WOULD NOT like to be coached

18. How confident do you feel planning lessons that include number sense and operations?
3 ... I'm NOT SURE if I would like to be coached

V. CLASSROOM MANAGEMENT

19. How confident do you feel encouraging student participation?
3 ... I'm NOT SURE if I would like to be coached

20. How confident do you feel with classroom management?
4 ... I WOULD NOT like to be coached

21. How confident do you feel managing a classroom where students are engaged in inquiry-based or discovery-based tasks?
4 ... I WOULD like to be coached

** Teacher Permission:* **Yes, please share with my coach.**

EXAMINING MATHEMATICS COACHING

EMC Teacher Needs Inventory: Example Coach Report for TEACHER 2

Teacher Last Name: **Teacher 2**
First Name:
Coach:
School:
Grade(s):
Date Taken:

KEY: Teachers rated the following 21 questions on **a scale from 1 to 5, with 1 meaning *not at all confident* and 5 meaning *very confident*.** Teachers then indicated whether or not they would like to partner with their coach on the particular topic, or that they are unsure.

I. TEACHING CONCEPTUAL AND INQUIRY-BASED LESSONS

1. How confident do you feel incorporating investigative, inquiry-based or discovery-based mathematics learning into your lessons?
2 ... I WOULD like to be coached

2. How confident do you feel using instructional strategies that are likely to increase students' mathematical conceptual understanding or problem-solving abilities?
3 ... I WOULD like to be coached

3. How confident do you feel engaging students in mathematical abstraction and sense-making (including symbol use, theory building, and justification and reasoning)?
1 ... I WOULD like to be coached

4. How confident do you feel using cooperative learning?
4 ... I WOULD like to be coached

II. CLASSROOM ENVIRONMENT

5. How confident do you feel about "reading" or detecting students' level of mathematical understanding?
2 ... I WOULD like to be coached

6. How confident do you feel using strategies to increase student collaboration or dialogue among students?
1 ... I WOULD like to be coached

7. How confident do you feel creating an environment where students listen to one another?
5 ... I WOULD like to be coached

8. How confident do you feel encouraging intellectual rigor, constructive criticism or challenging of ideas?
4 ... I WOULD like to be coached

III. CONCEPTUAL UNDERSTANDING OF MATHEMATICS

9. How confident are you with the mathematical reasoning behind the mathematics you teach – meaning the understanding of *why* we teach it, *how* it relates to other mathematics topics, and *why* it is valid?
1 ... I WOULD like to be coached

10. How confident do you feel creating and teaching mathematical applications and connections to other areas of mathematics?
1 ... I WOULD like to be coached

11. How confident do you feel planning lessons that include mathematical conceptual understanding?
1 ... I WOULD like to be coached

12. How confident do you feel planning lessons that include genuine mathematical problem-solving?
1 ... I WOULD like to be coached

13. How confident do you feel planning lessons that include proportional reasoning?
1 ... I WOULD like to be coached

14. How confident do you feel using questioning strategies such as higher-order questioning and wait time in the context of mathematics instruction?
2 ... I WOULD like to be coached

IV. MATHEMATICS CONTENT KNOWLEDGE

15. How confident are you with the mathematics that you teach?
3 ... I WOULD like to be coached

16. How confident are you with the mathematics beyond the mathematics that you teach, meaning the next grade level?
1 ... I WOULD like to be coached

17. How confident do you feel planning lessons that include fraction concepts?
1 ... I WOULD like to be coached

18. How confident do you feel planning lessons that include number sense and operations?
3 ... I WOULD like to be coached

V. CLASSROOM MANAGEMENT

19. How confident do you feel encouraging student participation?
5 ... I WOULD like to be coached

20. How confident do you feel with classroom management?
5 ... I WOULD like to be coached

21. How confident do you feel managing a classroom where students are engaged in inquiry-based or discovery-based tasks?
3 ... I WOULD like to be coached

** Teacher Permission:* **Yes, please share with my coach.**