

58th CMC-South Annual Mathematics Conference

California Mathematics Council - South

58th Annual Mathematics Conference

Growing Powerful Students: Mathematics as a GPS to Empower All

Palm Springs Convention Center • Renaissance Hotel • Hilton Hotel • Hard Rock Hotel

Friday, October 27 and Saturday, October 28, 2017

Navigate Your Way Through a Productive Lesson Study

Presented by:

Kim Webb
@NoodleKimw

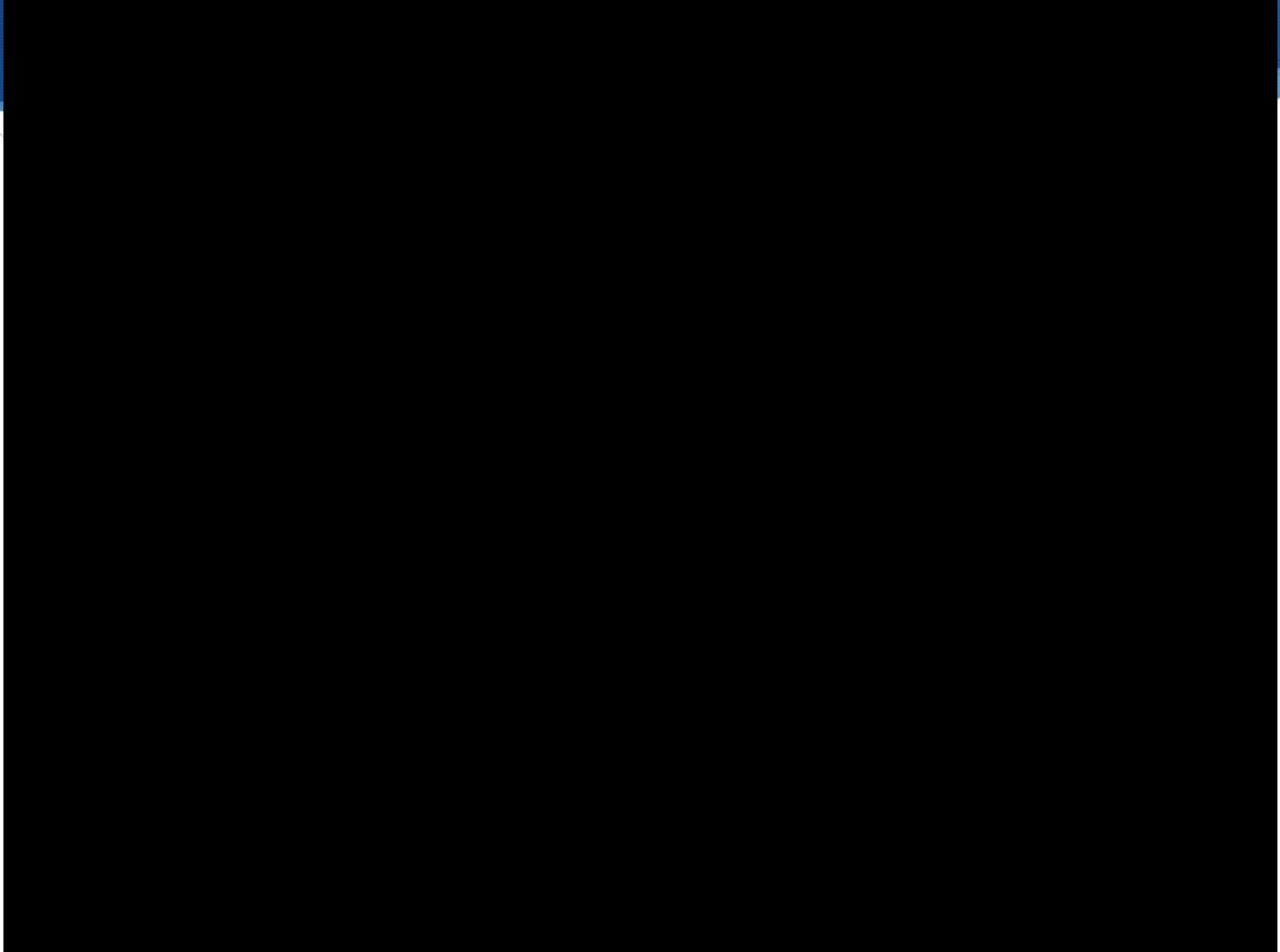
Arcy Alafa
@aalafa04



Tulare County
Office of Education

Jim Vidak, County Superintendent of Schools

Why A Lesson Study?



Steer Teachers' Power of Collaboration!

Build
Content
Knowledge

Lower Teacher's
Affective Filter

Utilize 5 Practices
for Orchestrating
Mathematical
Discussions



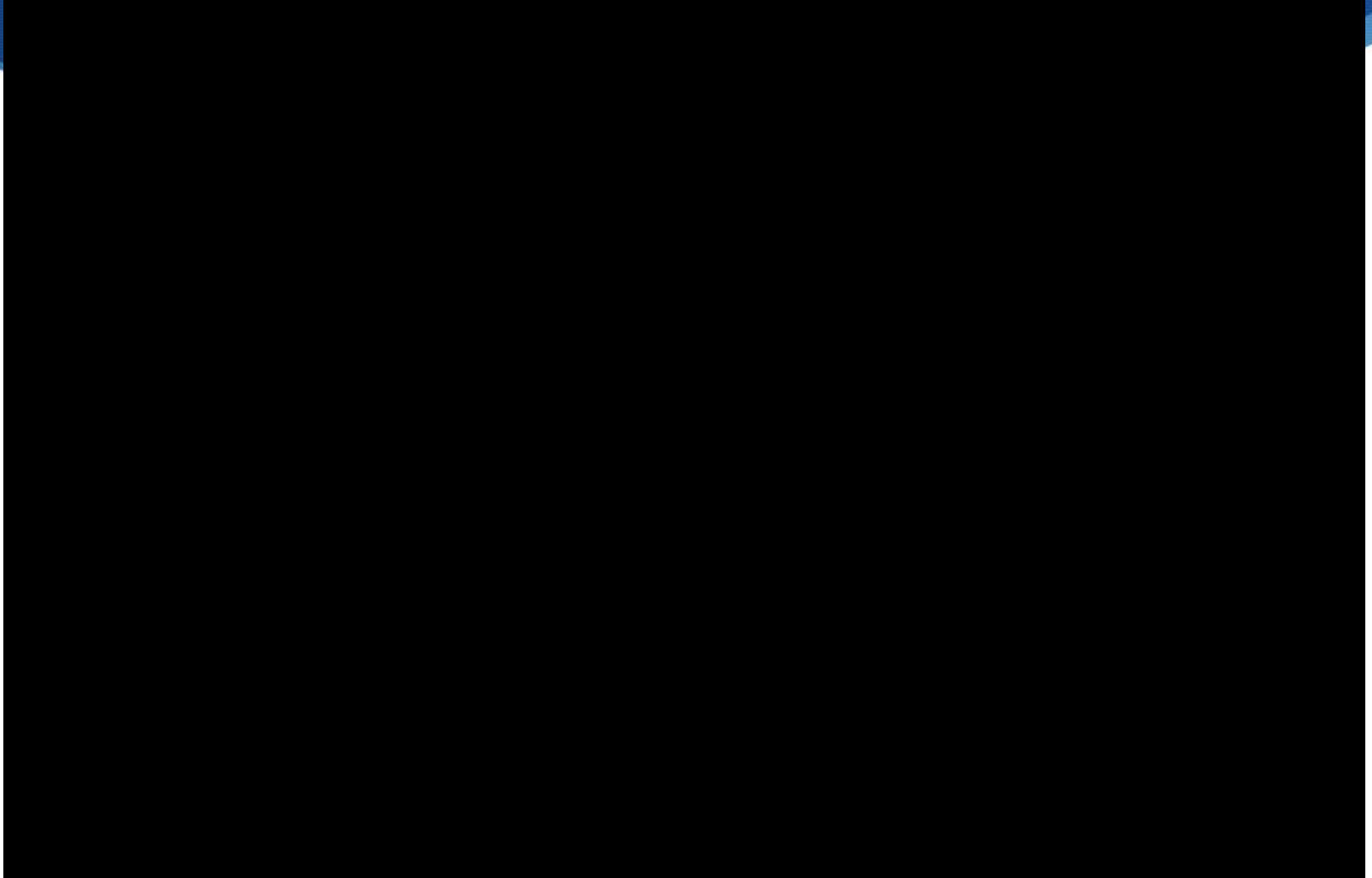
Participate in
Practical Lesson
Design

Empowering Teachers and Students

- Promote Reflective Practice
- Provide Opportunities for Student Mathematical Discourse and Growth Mindset



Teachers' Role



Purpose

- Focus on student interaction with math and student discourse
- Focus is NOT on the teacher



Lesson Study Map

- Time allotted
- Number of Teacher Participants
- Order of Teachers
- Role of Teachers
- Planning and Debrief Area
- Share Strengths and Opportunities



Lesson Study Schedule

Lincoln Math PD 2017-18
Kindergarten
10/12/17



7:45 - 9:15 AM Math PD and Lesson Development in Room 16 ½ (Arcy's Office)



Time	Co-Teach Lesson	Room	Subs (Room)
9:20 – 10:05 AM	Kim Webb & Ally Stout	7	
10:05 – 10:35 AM	Debrief & Lesson Refinement	16 ½	
10:35 – 11:20 AM	Kim Webb & Amber Brandt	16	
11:20 – 12:20 PM	LUNCH		
12:20 – 12:50 PM	Debrief & Lesson Refinement	16 ½	
12:50 – 1:35 PM	Kim Webb & Dave Herndon	6	
1:35 – 2:05 PM	Debrief & Lesson Refinement	16 ½	
2:05 - 3:15 PM	Unit Adjustment/Next Steps <u>Arcy's Office</u>		



Today a Lion! Tomorrow a Leader!

5 Practices for Orchestrating Mathematical Discussions

0 - Selecting the Task

1 - Anticipating

2 - Monitoring

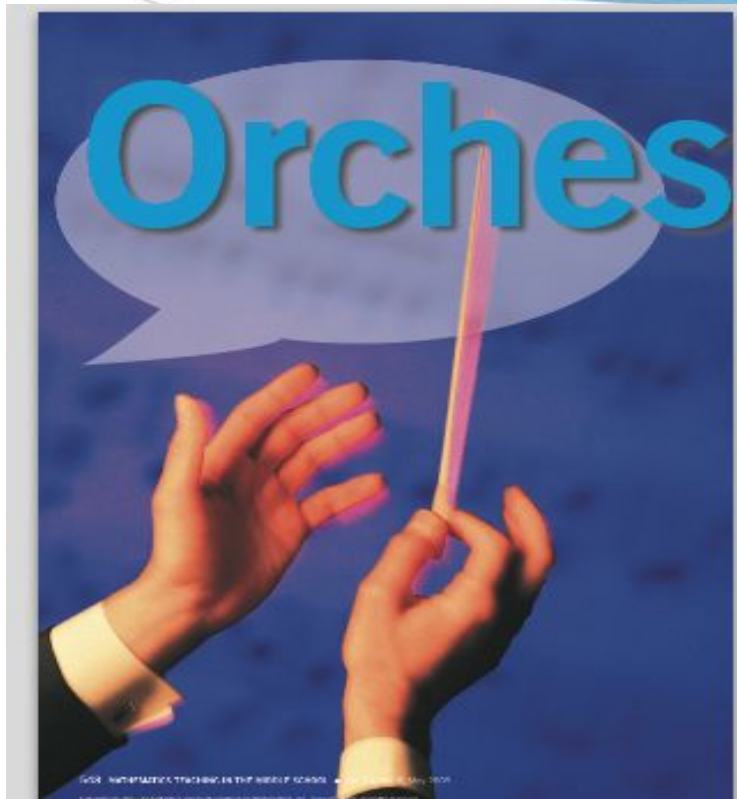
3 - Selecting

4 - Sequencing

5 - Connecting



5 Practices



Orchestrating Discussions

Five practices constitute a model for effectively using student responses in whole-class discussions that can potentially make teaching with high-level tasks more manageable for teachers.

Margaret S. Smith, Elizabeth K. Hughes, Randi A. Engle, and Mary Kay Stein

Margaret S. Smith, professor of mathematics education at the University of Pittsburgh, Over the past decade she has been developing research-based models for use in the development of professional teachers and designing what teachers learn in the practice of their profession in which they engage. **Elizabeth K. Hughes**, assistant professor of mathematics education at the University of Pittsburgh, has been a leader in research on professional development, teacher education and the use of practice-based materials in developing teachers' understanding of what it means to teach and learn mathematics. **Randi A. Engle**, associate professor of mathematics education and the social context of learning at the University of California, Berkeley, she is interested in developing practical theories for how mathematics teachers can create discussion-based learning environments that promote deep student engagement, learning, and learning. **Mary Kay Stein**, associate professor of mathematics education at the University of Pittsburgh, has been a leader in research on professional development and the social context of learning.

Discussions that focus on cognitively challenging mathematical tasks, namely those that promote thinking, reasoning, and problem solving, are a primary mechanism for providing conceptual understanding of mathematics. (Hollman and Hughes, 1991; Michaels, O'Connor, and Ferriter, forthcoming). Such discussions give students opportunities to construct and clarify understanding, develop convincing arguments, engage deeply and thoughtfully, develop language for expressing mathematical ideas, and learn to use language from other perspectives (NCTM, 2003). Although discussions are a high-level task, providing practice

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Structure of the Planning Session

- Choose standard that applies to current pacing
- Create a Notice and Wonder
- Develop the math problems
- Teachers DO the Math
- Discuss delivery of lesson



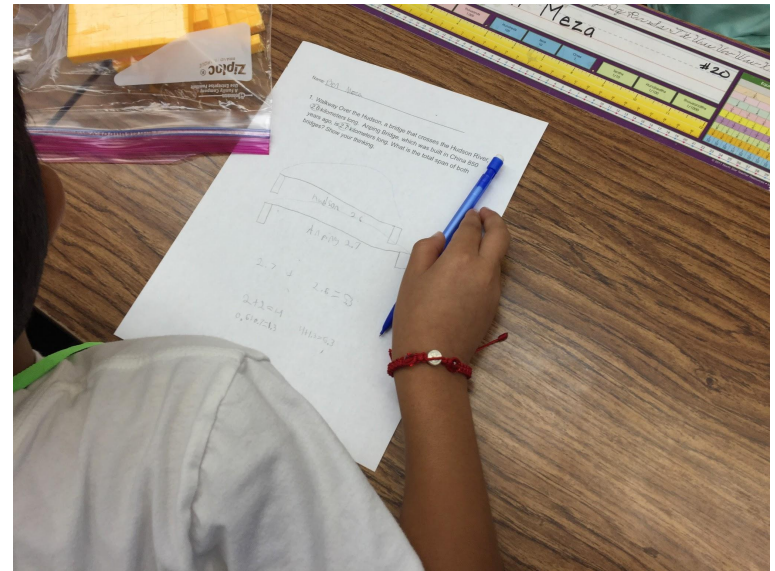
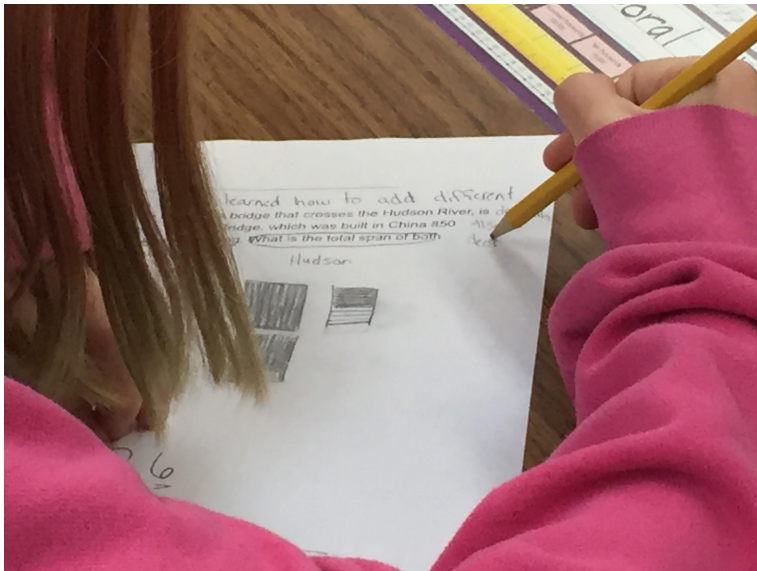
Who Should Be Involved?

principal
TEACHERS
students
math consultant
LITERACY COACH
assistant principal
math coach

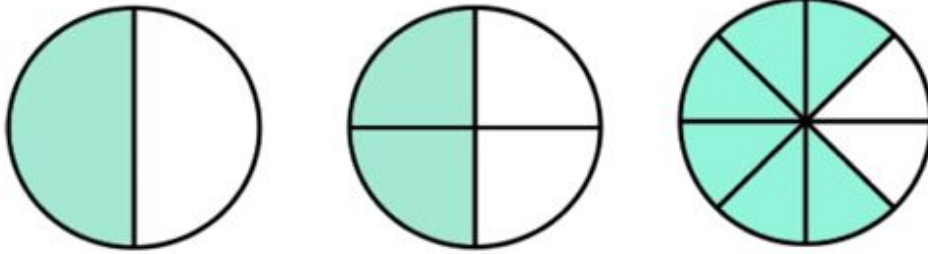
Literacy Coach



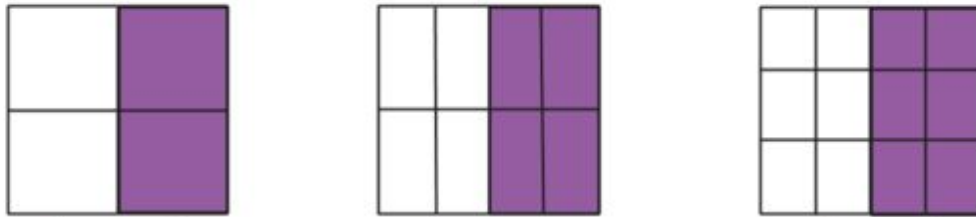
Let's Explore "The Math"



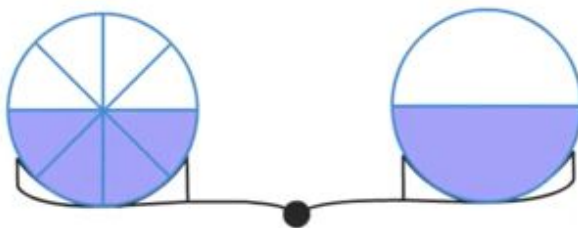
A



B



C



Math Stories

Materials:

- Chart paper or white board
- Markers
- Student copy of word problem

Procedures:

1. Tell students they will be reading a "math story."
2. Each student will have a math story face down on their desk (no pencils).
3. First Read: Students will have 30 seconds to read the math story. As they read, students will need to remember as much information from the story as they can. If they finish reading the story early, students can read the problem again. After 30 seconds, students will turn the paper face down again.
4. Teacher will ask students to share everything that they remember from the story.

Jerry was making two different types of cookies. One recipe called for $\frac{3}{4}$ cup of sugar and the other called for $\frac{2}{3}$ cup of sugar. How much sugar did he need to make both recipes?

12. Students will make a number sentence to match their drawing.

13. Students will share aloud their number sentences and answers to the question.

14. Students and teacher complete their answer statement.

Numberless Word Problems

There are some people going on a field trip to the museum. They are taking vans to get there. Each van holds the same number of people.

Numberless Word Problems

There are 35 people going on a field trip to the museum. They are taking vans to get there. Each van holds the same number of people.

Numberless Word Problems

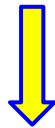
There are 35 people going on a field trip to the museum. They are taking vans to get there. Each van holds 8 people.

Numberless Word Problems

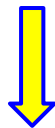
There are 35 people going on a field trip to the museum. They are taking vans to get there. Each van holds 8 people. How many vans will they need?

Select and Sequence

Mistake



Least sophisticated approach



Most sophisticated approach

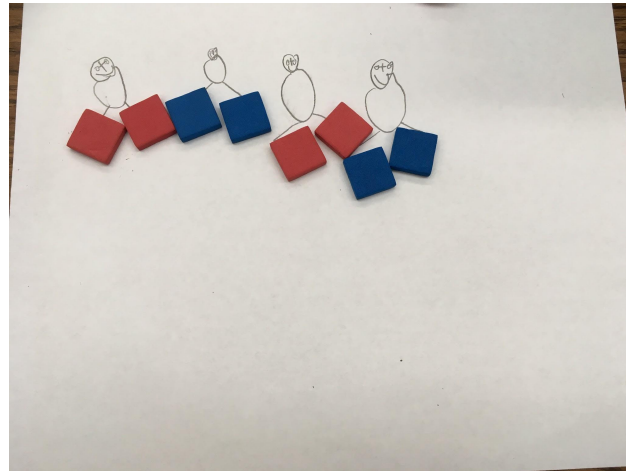
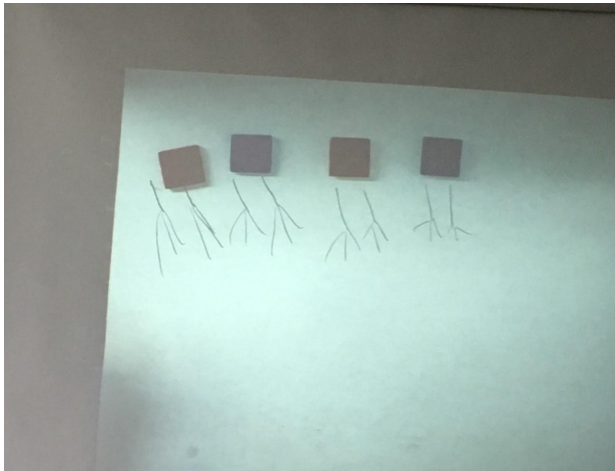
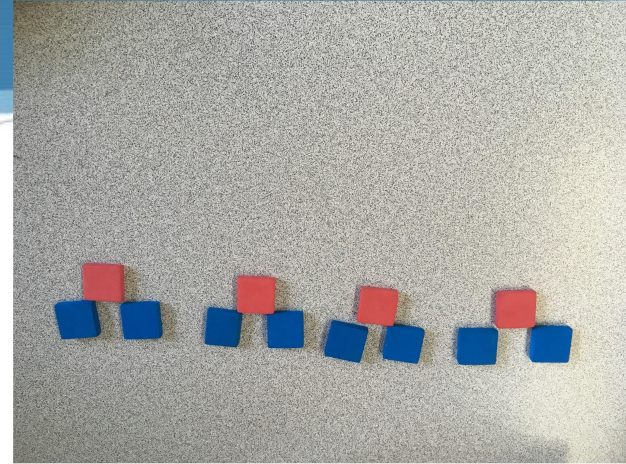
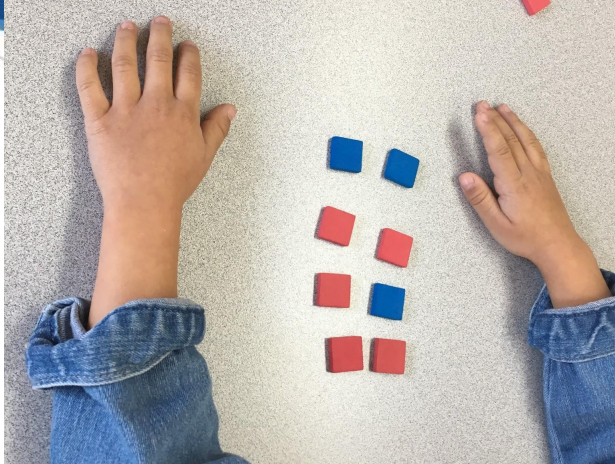


Kindergarten Notice and Wonder

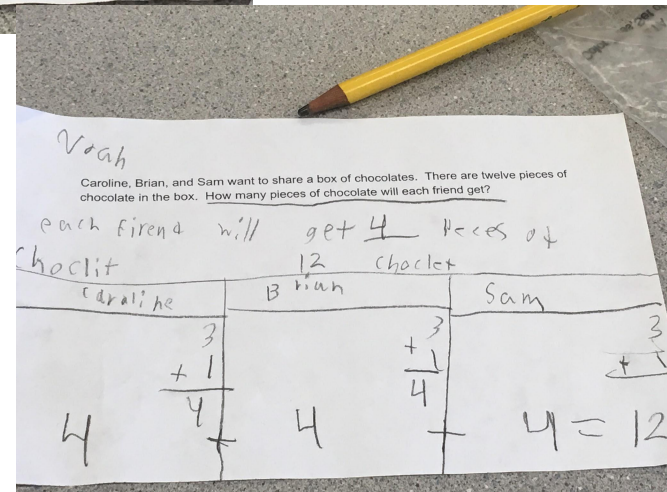
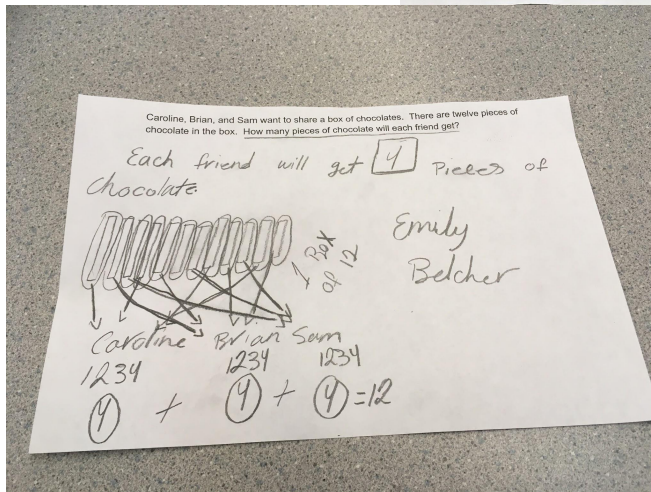
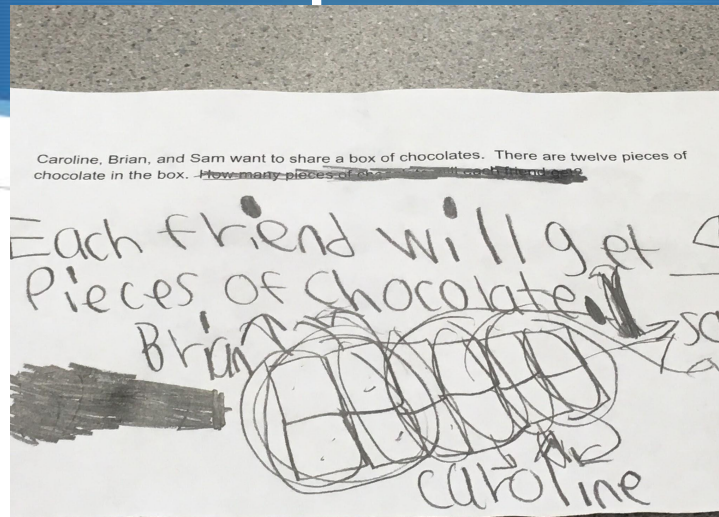
My math story is
about a sad
grasshopper...



Kindergarten Select and Sequence



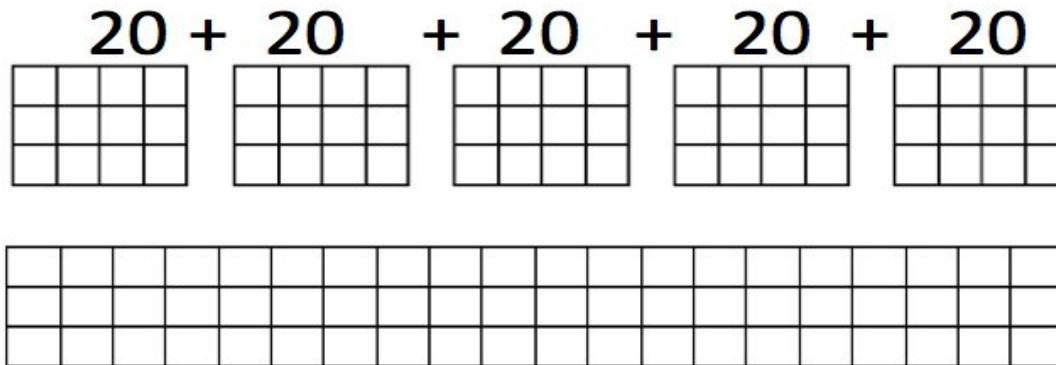
3rd Grade Select and Sequence



Sequencing

CRITIQUE, CORRECT, & CLARIFY

I multiply the second one by 5. I picked 5 cause $20 \times 5 = 100$. So then you times 9 and get 45 and that make 100, which is the answer. See my picture below:



IMPROVE FOR CLARITY

I multiply the second one by 5. I picked 5 cause $20 \times 5 = 100$. So then you times 9 and get 45 and that make 100, which is the answer.

IMPROVE FOR CLARITY

UNITS

I multiply the second one by 5. I picked 5 cause $20 \times 5 = 100$. So then you times 9 and get 45 and that make 100, which is the answer.

I multiply the second one by 5. I picked 5 cause 20 **squares** $\times 5 = 100$ **squares**. So then you times 9 **lines by 5** and get 45 **lines** and that make 100 **squares**, which is the answer.

Connecting Students' Strategies

IMPROVE FOR CLARITY GIVEN, CLAIM, RATIONALE

I multiply the second one by 5. I picked 5 cause $20 \times 5 = 100$. So then you times 9 and get 45 and that make 100, which is the answer.

9 lines forms 20 squares. I multiply **this shape** by 5. I picked 5 cause **20 squares** $\times 5 = 100$ squares. Since I multiplied 20 squares by 5, I also need to multiply 9 lines by 5, which is 45 lines. I think that 45 lines will make 100 squares.

Learning Goals

I learned another way to multiply from Ethan and the teacher didn't talk a lot!
-Vincent
(5th grader)

Today in math I learned that there are many ways to solving a problem.
-Maria
(3rd grader)

I learned you can learn from your mistakes!
-Adriana
(2nd grader)

Today I learned how to draw pictures that match the math story.
-Josh
(Kinder)

Opportunities to Debrief



Post Lesson Debrief

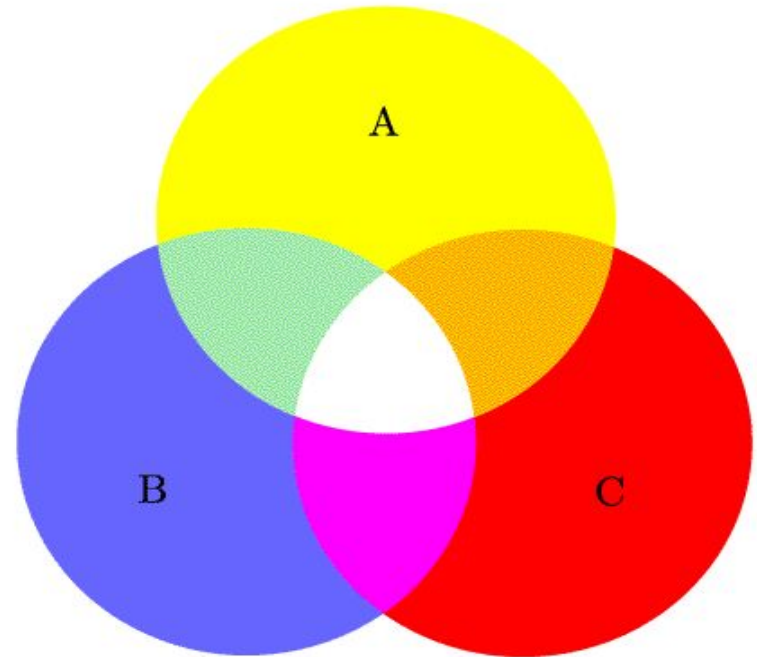
- Celebrations first – start with teacher who taught
- Inquiry Stance – be specific
- Outcome for the model
- Opportunities
- Make adjustments to lesson

Possible Challenges

- Learning journey... we're all learning together!
- Sustain the change
- Substitutes
- Time

How is this lesson study format the same or different from other models?

In your group,
please share
your thoughts.



Application

How might you apply this structure at your school?



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Learning Goal

What did you find valuable/useful?

Write or tweet (@CAMathCouncil and #cmcmath).

Please be prepared to share out.



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Questions and Concerns

When you improve a little each day, eventually big things occur. . . . Not tomorrow, not the next day, but eventually a big gain is made. Don't look for the big, quick improvement. Seek the small improvement one day at a time. That's the only way it happens—and when it happens, it lasts.

(Wooden, 1997, p. 143)





Contact Us



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Session 115



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