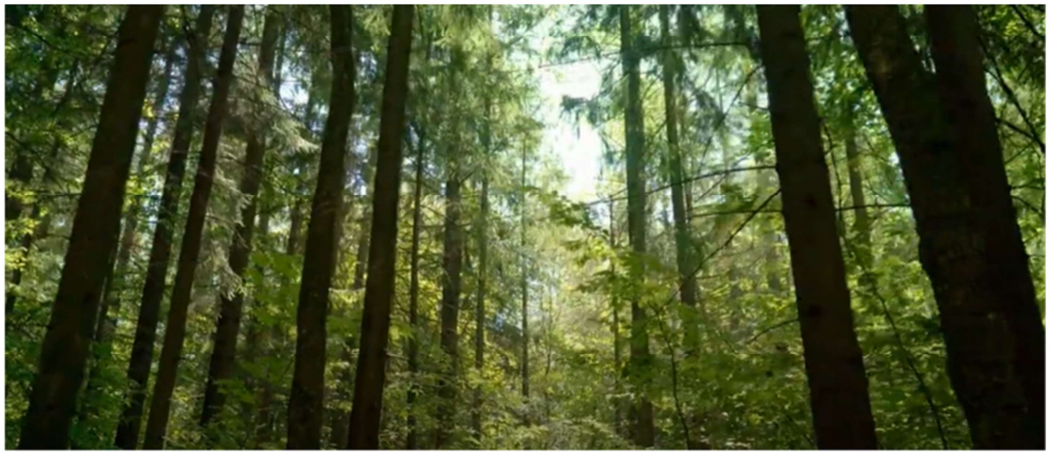
Professional Learning Network # 3:
High-Impact Instructional Practices Continued

CATHOLIC PRINCIPALS LEADERSHIP DEVELOPMENT | LEADERSHIP EN ACTION | PRINCIPAL ASSOCIATION PROJECTS

Land Acknowledgement



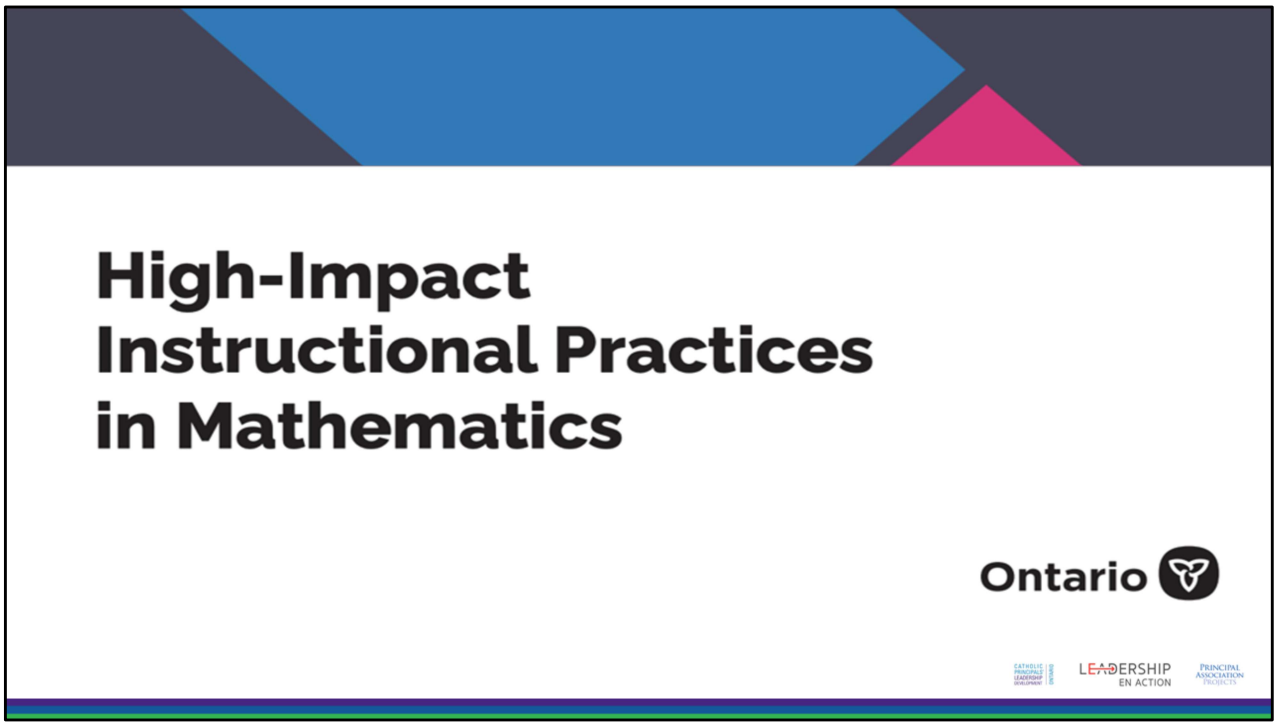
"We are invited into this beautiful blanket of life."

~Isaac Murdoch

Welcome everyone and thank you for joining us. I would like to begin by acknowledging the ancestral lands of the Mississaugas of the Credit, from where I am speaking to you today. We are grateful to the MichSaagiig people for their stewardship of this land.

Isaac Murdoch, who has spent much time (in DPCDSB) helping is to learn about the Anishinaabek histories, people and ongoing presence of the Anishinaabek nation. He reminds us that "**we are invited into this beautiful blanket of life"**. This is an important reflection for us, as it speaks to our responsibilities as invited guests, and to be gracious of the privilege we have to inhabit these lands.

I would like to encourage you to acknowledge the lands on which you have been invited today and add them to the chat.



Today we are looking at the document provided as a resource with the curriculum. It helps to inform teachers' pedagogical moves. And as leaders we need to think about what it says, how we can support teachers to implement these ideas, and what it might look like in classrooms where these practices are in use.

Components of Effective Math Instruction

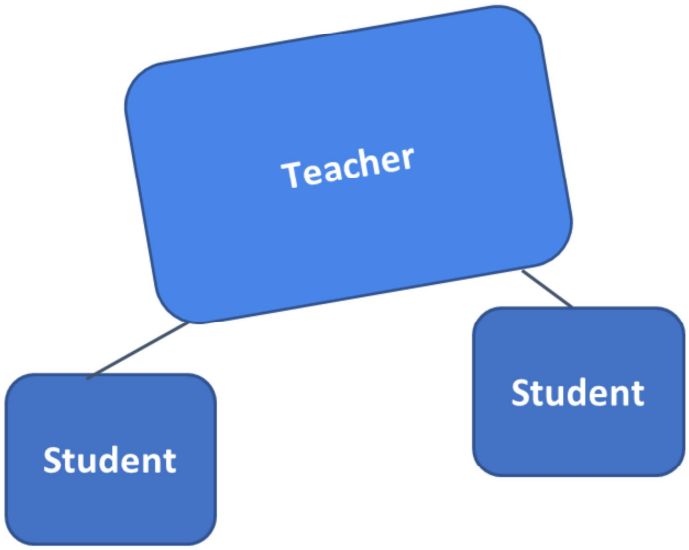
High-Impact Practices | Fact Sheets

Math conversations

- Conversations about math build understanding as students listen and respond to their classmates' expression of mathematical ideas.
- Students may share their ideas
  - With a partner or within a small group.
  - In the context of whole class discussions,
  - Or in the course of questioning and specific math-talk routines.

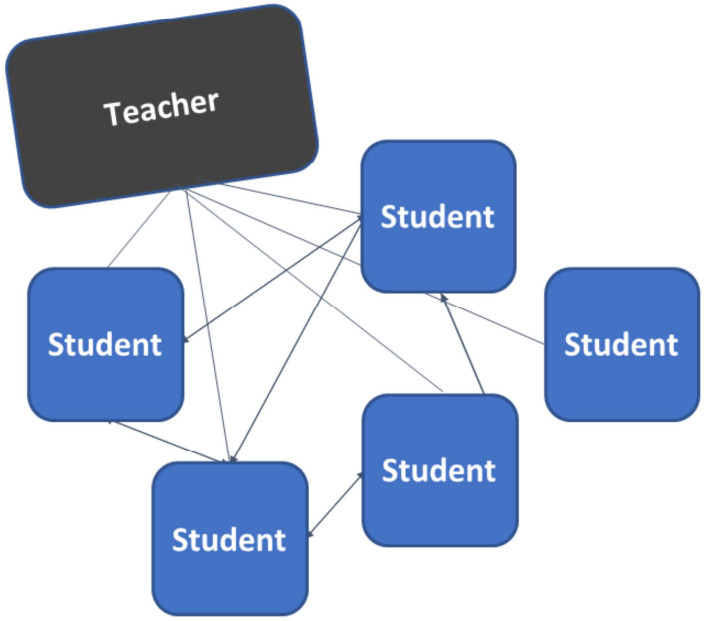
High Impact Instructional Practices in Mathematics, 2020

Facilitating meaningful mathematical discourse means:



Moving from teacher to student interaction to student to student interaction

Student to student interaction



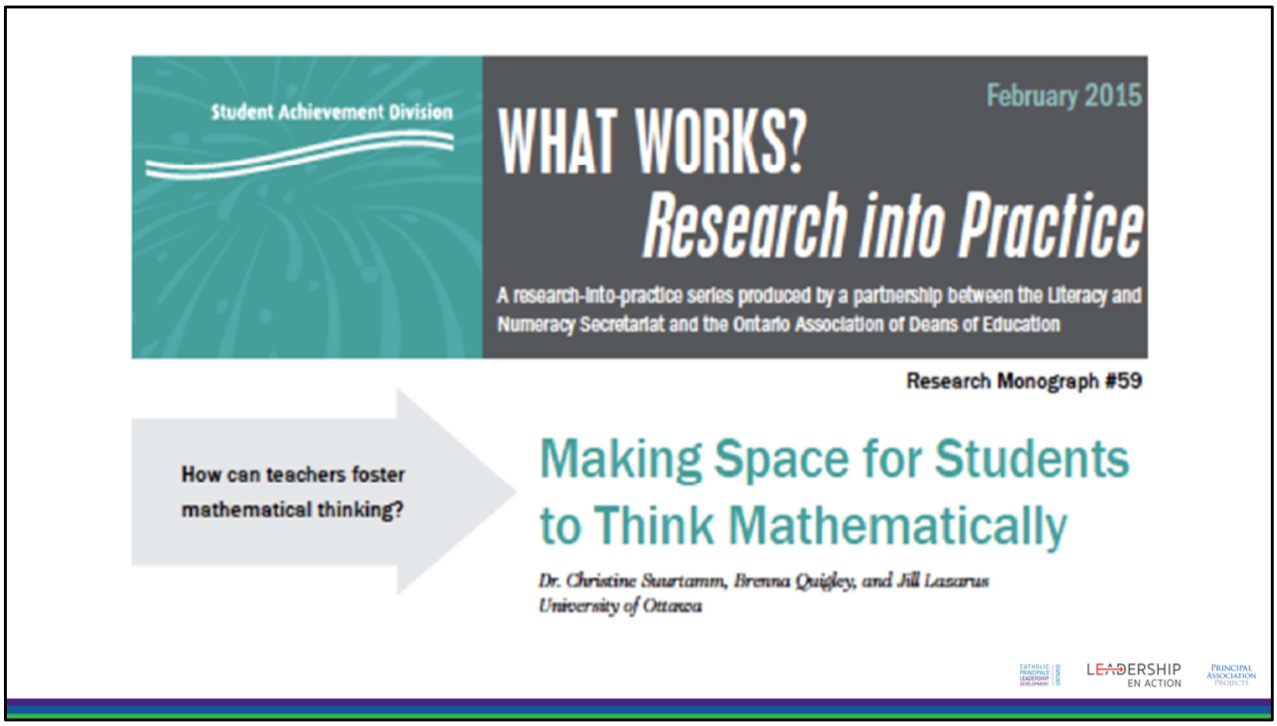
Building shared understanding through mathematical discussion

Math Conversations

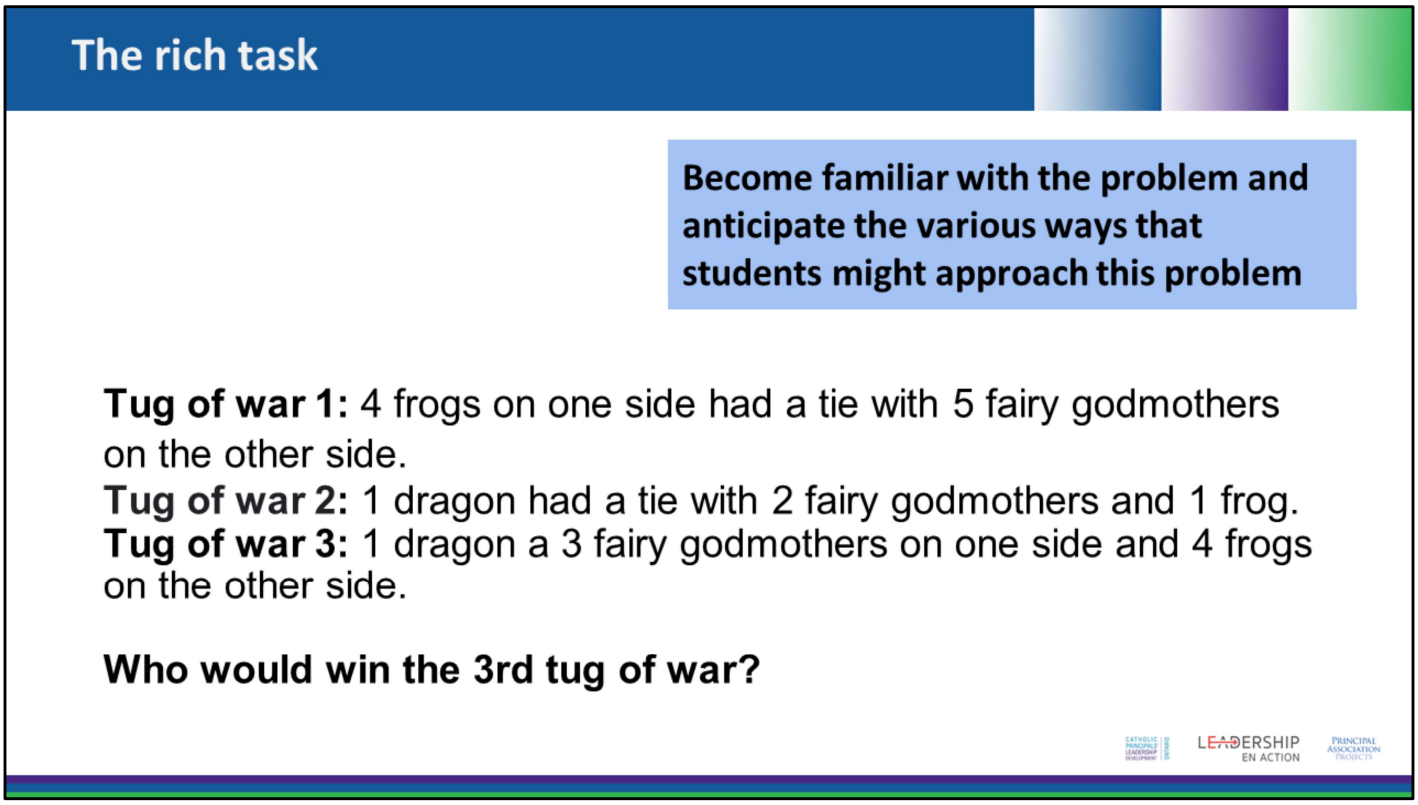
Math conversations result from educators asking good questions

- Good questions help to move students; thinking forward, provoke discussion, highlight key concepts, or probe different skills or representations.
- Asking questions takes careful planning and by "doing the math" in advance.
- Open questions allow for multiple responses, invite additional discussion from students, and move the math conversation from educator-student interactions to student-to-student math dialogues.

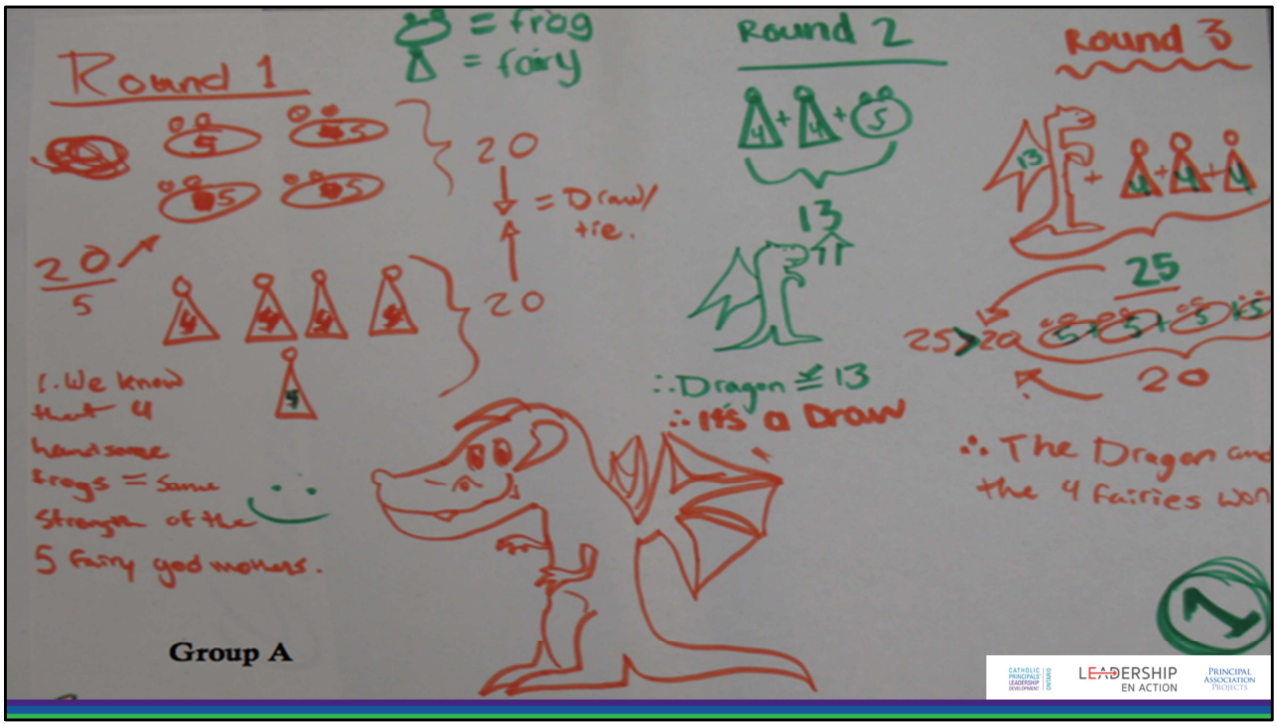
High Impact Instructional Practices in Mathematics, 2020



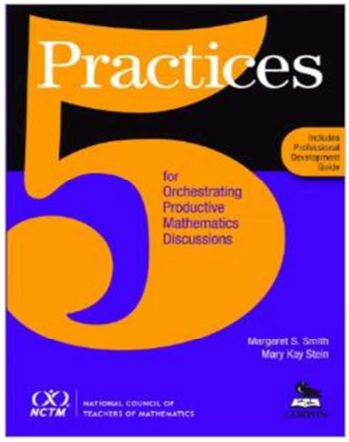
This monograph gives some ideas to teachers about ways to facilitate mathematics discussions in both whole class and small group discussions. It is based on a case study of a teacher and discusses working through a rich task with her class.



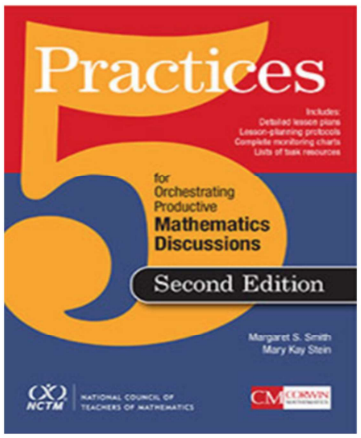
This problem is drawn from the above monograph and we will look at the ways the teacher connected mathematical ideas.


Round 1
= frog
= fairy
20
= Draw/ tie.
20
20/5
1. We know that 4 handsome frogs = same strength of the 5 Fairy god mothers.
Group A
Round 2
13
∴ Dragon ≤ 13
∴ It's a Draw
Round 3
25
25 > 20
20
∴ The Dragon and the 4 Fairies won
1

The 5 Practices for Orchestrating Productive Mathematics Discussions



- Anticipating
- Monitoring
- Selecting
- Sequencing
- Connecting



Smith & Stein, 2011

2018

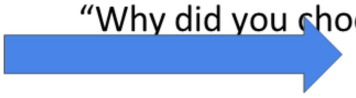
The teacher facilitated a whole class discussion after students have worked on the problem

The teacher purposefully selected and sequenced student work so that the work represented the various strategies groups used, and so that the teacher could help the class make connections between solutions using whole class discussion:

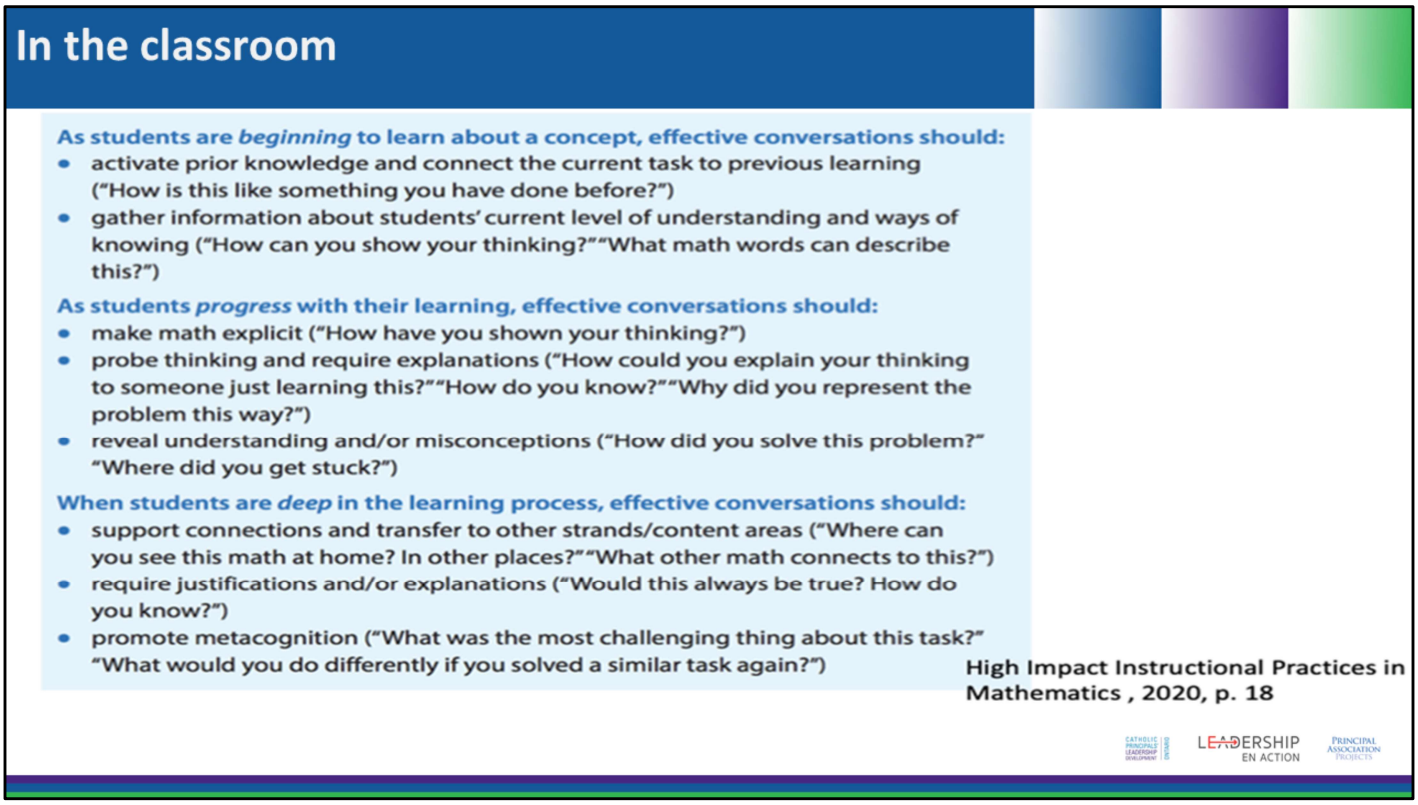
The teacher skillfully posed questions to elicit student thinking; and Expected students to pose questions to the presenters

- Over time the teacher said that students moved from:

"Why did you choose to use red and blue markers?"



" Why did you use the number 20? "

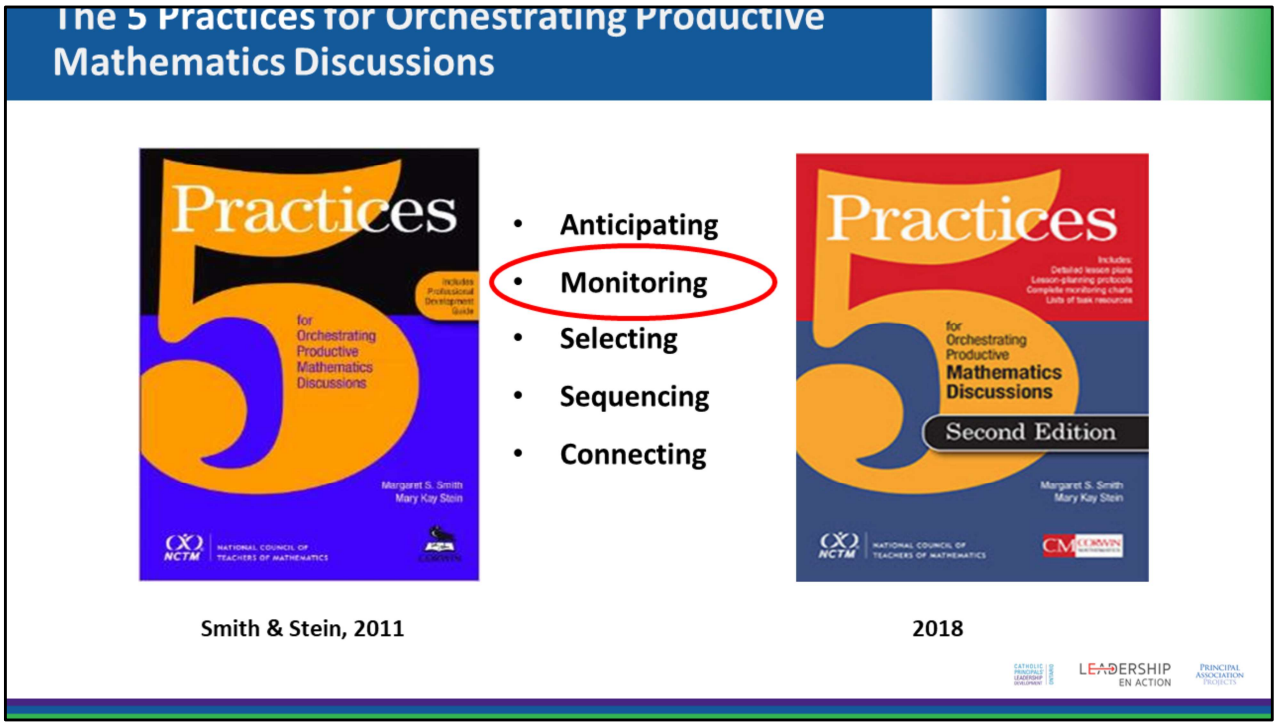


Here are some question ideas taken from the High Impact Instructional Practices Document

Pose purposeful questions
Teacher and student actions

What are *teachers* doing?	What are *students* doing?
• Advancing student understanding by asking questions that build on, but do not take over or funnel, student thinking. • Making certain to ask questions that go beyond gathering information to probing thinking and requiring explanation and justificaion. • Asking intentional questions that make the mathematics more visible and accessible for student examination and discussion. • Allowing sufficient wait time so that more students can formulate and offer responses.	• Expecting to be asked to explain, clarify and elaborate on their thinking. • Thinking carefully about how to present their responses to questions clearly, without rushing to respond quickly. • Reflecting on and justifying their reasoning, not simply providing answers. • Listening to, commenting on, and questioning the contributions of their classmates. (Principles to Action, NCTM, 2014)

This is another great resource that discusses effective teaching practices and provides many different charts and tables that would be useful to teachers.



Another of the 5 practices for orchestrating productive math discussions is monitoring the learning.
What you would see is the teacher would be identifying the strategies used by visiting with small groups, answering and asking questions.
This year, with covid we would definitely see smaller groups than usual. Maybe groups of 1-2 students that are physically distanced or in a virtual breakout room.
During this discussion the principal would also see the teacher documenting each student's learning. Some simple questions a teacher may be asking themselves to probe the students could include, "What are students doing? What strategies are being used?"
This is the prime opportunity for the teacher to redirect students if they have misunderstood the question.

Let's take a look at what this might actually sound like.

Math Problem

Tug of war 1: 4 frogs on one side had a tie with 5 fairy godmothers on the other side.
Tug of war 2: 1 dragon had a tie with 2 fairy godmothers and 1 frog.
Tug of war 3: 1 dragon a 3 fairy godmothers on one side and 4 frogs on the other side.

Who would win the 3rd tug of war?

Remember the tug of war problem where... (read the slide)

Teacher Questions in Action When Working with a Small Group

Teacher: Ok, so can you explain this to me?

Kareem: Well, we thought that 4 frogs and 5 fairy godmothers were of the same strength, so we divided 4 by 5, for a rate of what it takes for one frog to beat a fairy godmother.

Teacher: What made you think of unit rates?

Kareem: Uh, because we wanted [inaudible comment] a number.

Teacher: What did you find out when you did that? [. . .] How many frogs were there?

Kareem: Four.

Teacher: And how many fairy godmothers were there?

Kareem: Five.

Teacher: So, if you . . . you said you divided 4 frogs by 5 fairy godmothers. . .

Kareem: Ya. [. . .] So, we got 0.8, because that's how much. . .

Brian: That's how many fairies there are . . .

Kareem: equal So, basically, one frog could beat a fairy because the frog is stronger. One whole frog is to. . . Or no. One fairy godmother is equal to. . .

Teacher: Ok, why does that make sense?

Kareem: wanted of 5 Well, they tied when it was 4 frogs, but it was 5 fairy godmothers. It was equal. So, we to find out what it was for one frog. So, we divided 4 by 5 to figure out what was the 4 out [inaudible] to find out what could beat one fairy godmother.

C. Suurtamm

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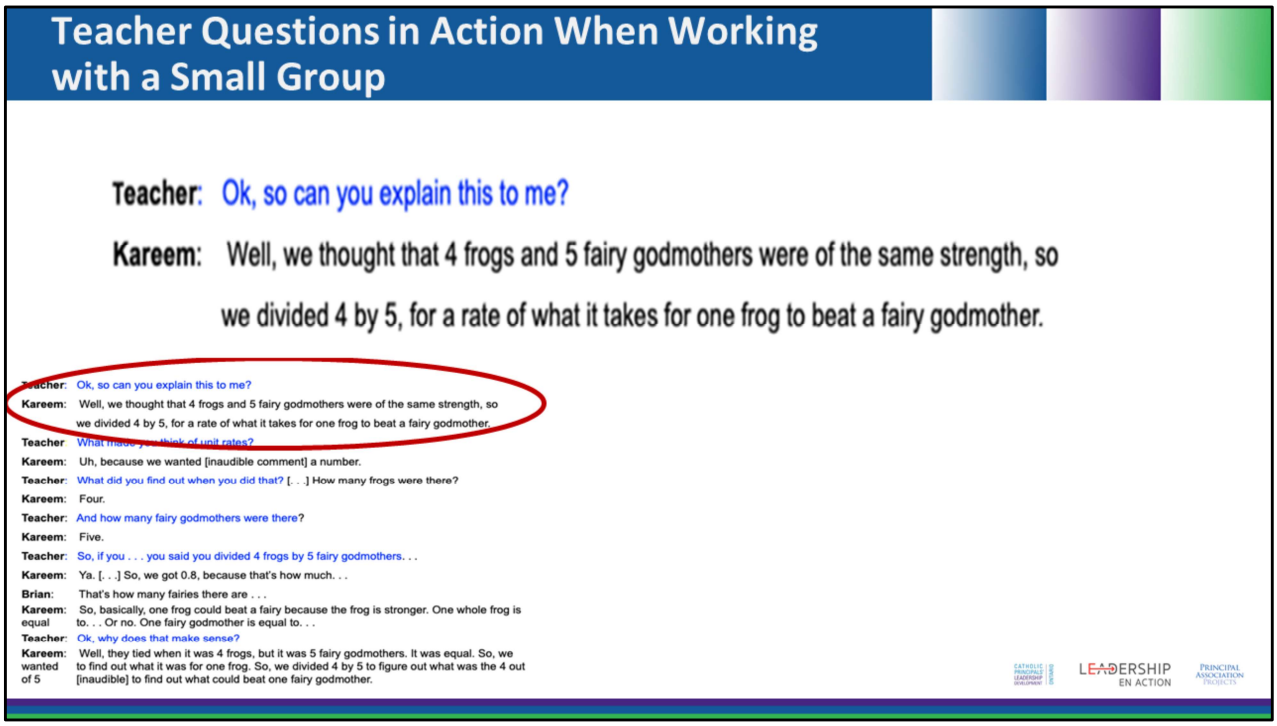
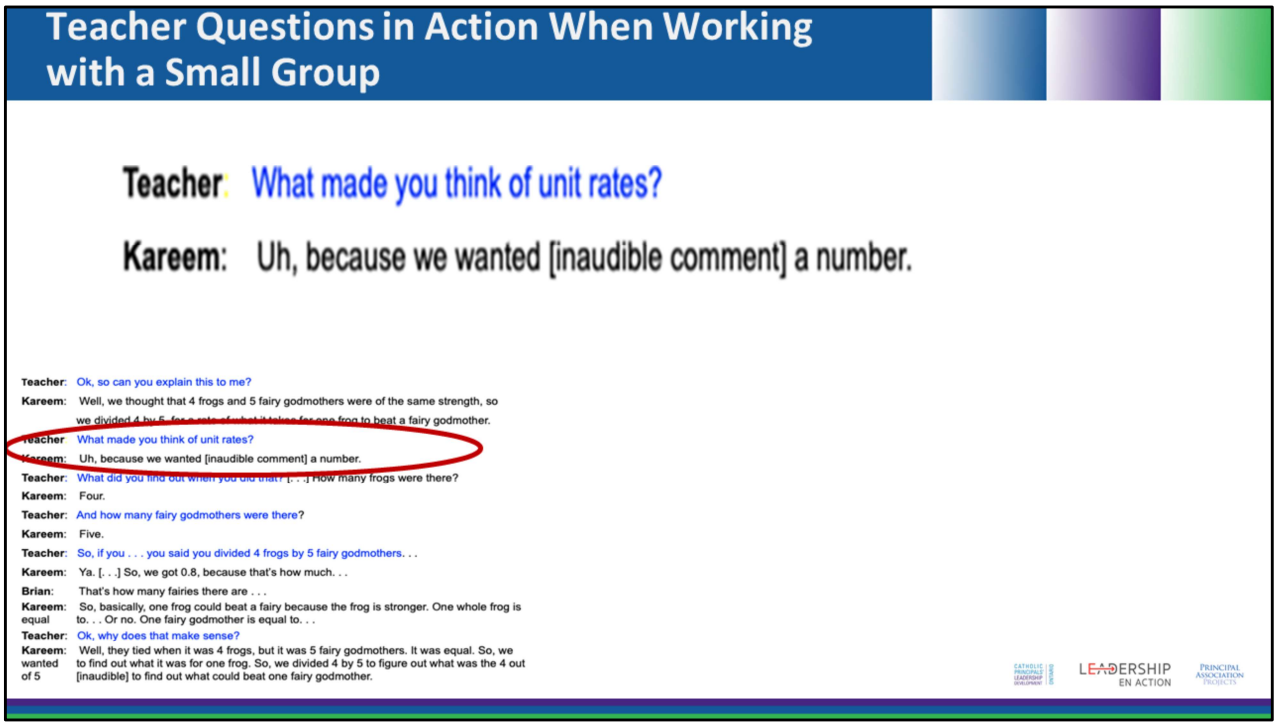
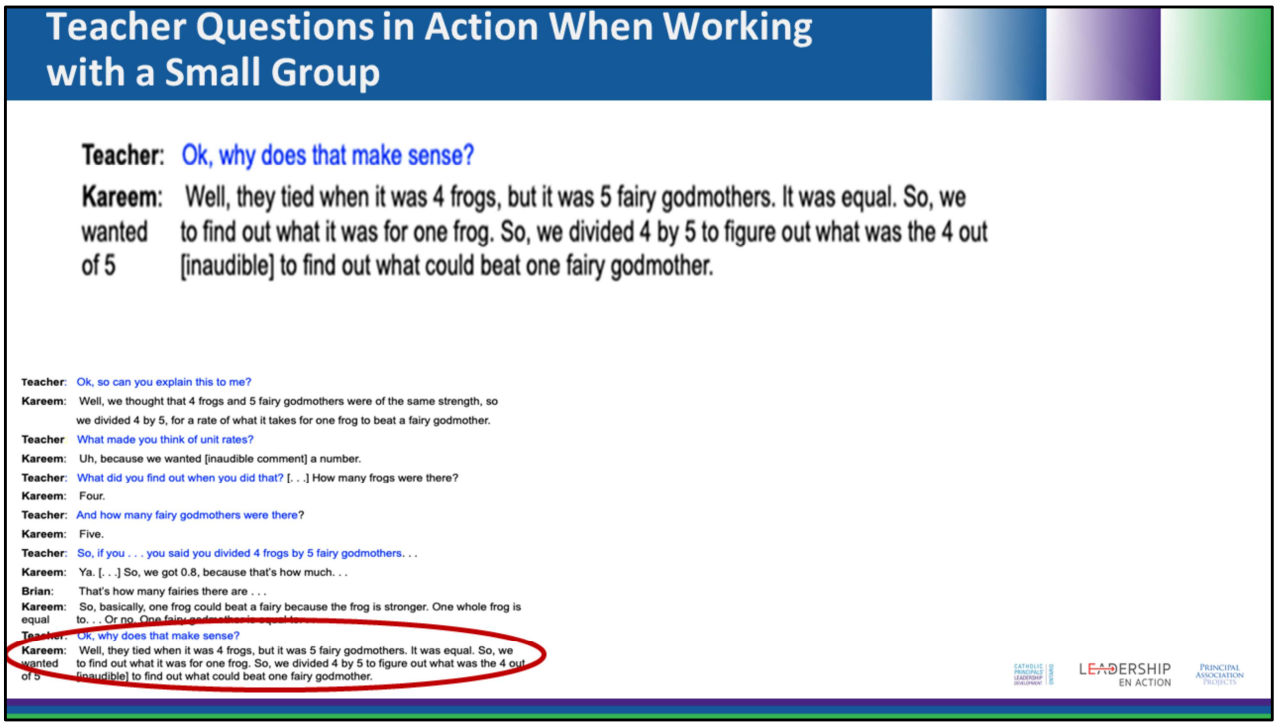
Here is an actual dialogue with a small group. Please take a moment to read through it. At first glance, the dialogue seems fairly straightforward, but when you read the teacher probing, what do you notice? Please share your thoughts in the chat box.



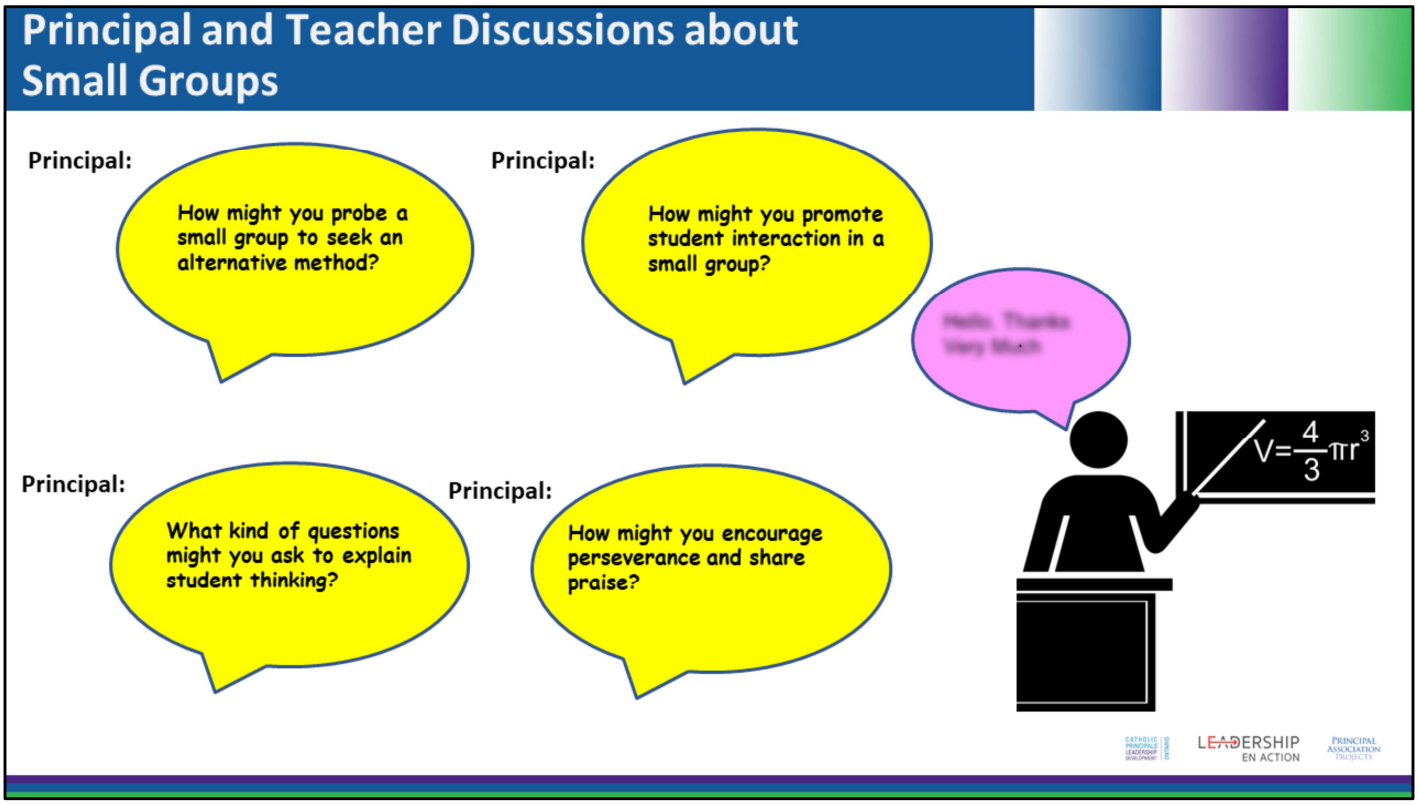
Highlight-the teacher's ability to interpret what the students are saying-understand, and make sense of what the student is thinking. Notice that the teacher didn't jump directly to telling the students they were right and moving on.



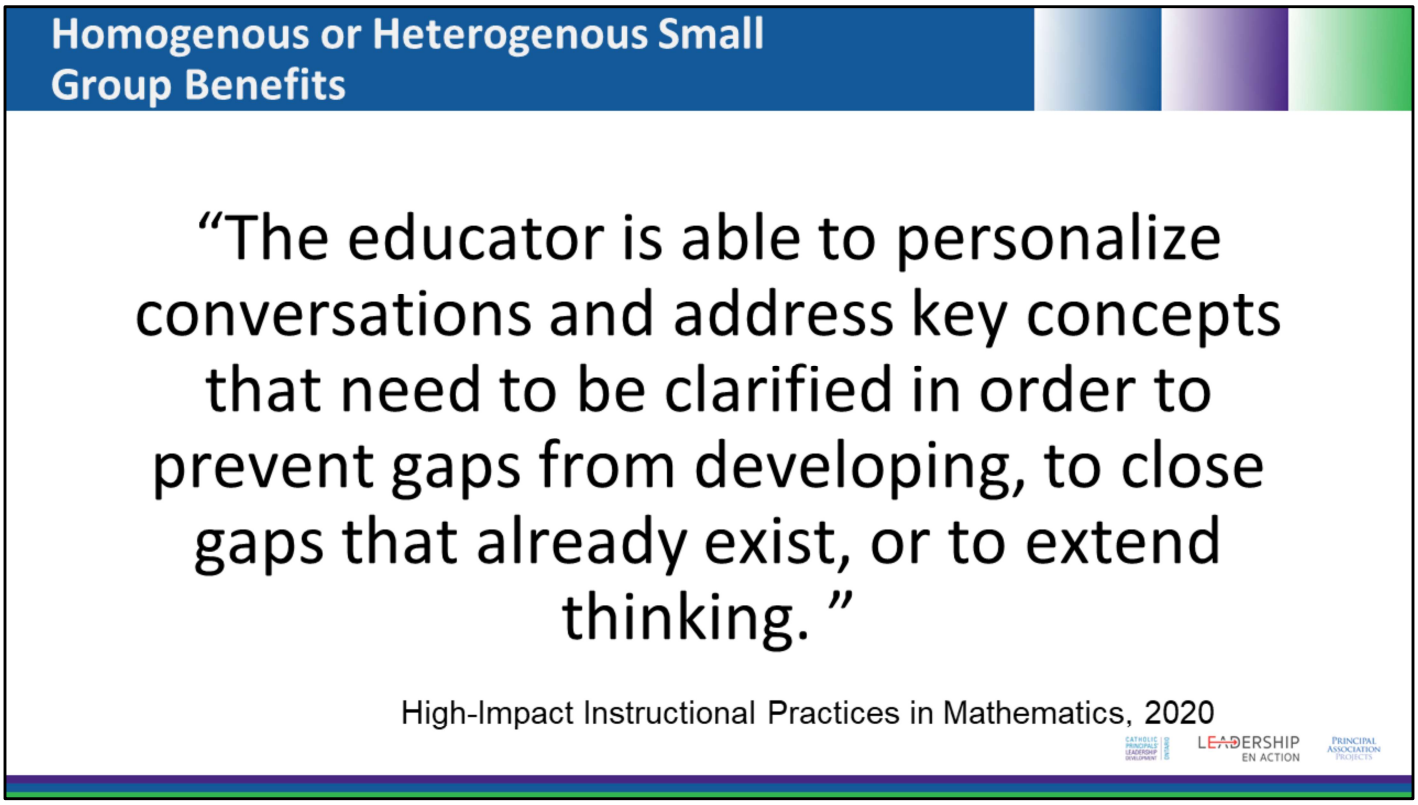
Did the teacher's question of "What made you think of unit rates?" jump out at you as well? At first you may have thought that the teacher was leading the discussion too strongly in a certain direction. But perhaps you may have thought that the teacher was giving the students the vocabulary required to explain their thinking.



Once again the teacher is probing here to ensure that the students are able to articulate why this makes sense (or not).



As a follow up to a class observation of small group math interactions, a principal might use some of these questions to probe the instruction further.



Small groups are particularly important when we think about differentiating for students and meeting them where they are at.

These groups can take place at various times during a lesson and not always at the end. This scaffolding can target the gaps that already exist by engaging prior knowledge or pre-teaching math vocabulary to students. It can also extend thinking as in the tug of war example after a group has had time to explore possible solutions.

The art to being an instructional leader as a principal is to probe your teachers to find out why, when, and how groups are formed. This opens up the planning and thinking of teachers when personalizing conversations.

Beginning, Progressing, and Deep Discussions

When students are *beginning* to learn about a concept, small-group instruction should:

- revisit math concepts that support the new learning
- activate students' prior knowledge by making connections to their lived experiences

As students *progress* with their learning, small-group instruction should:

- reinforce understanding through the use of representations
- involve comparing and contrasting problems and examining problem structures

When students are *deep* in the learning process, small-group instruction should:

- extend students' thinking and encourage the transfer of skills to other math concepts and strands
- support metacognition by inviting students to think about their learning

High-Impact Instructional Practices in Mathematics, 2020

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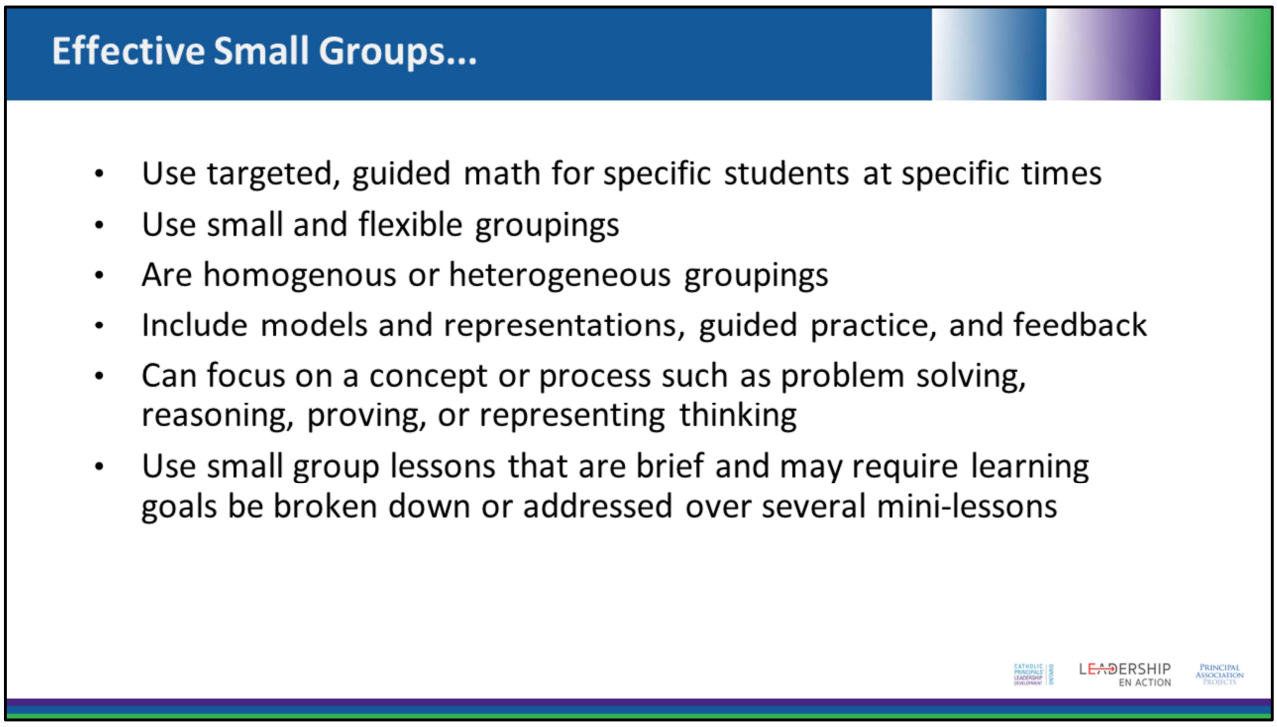
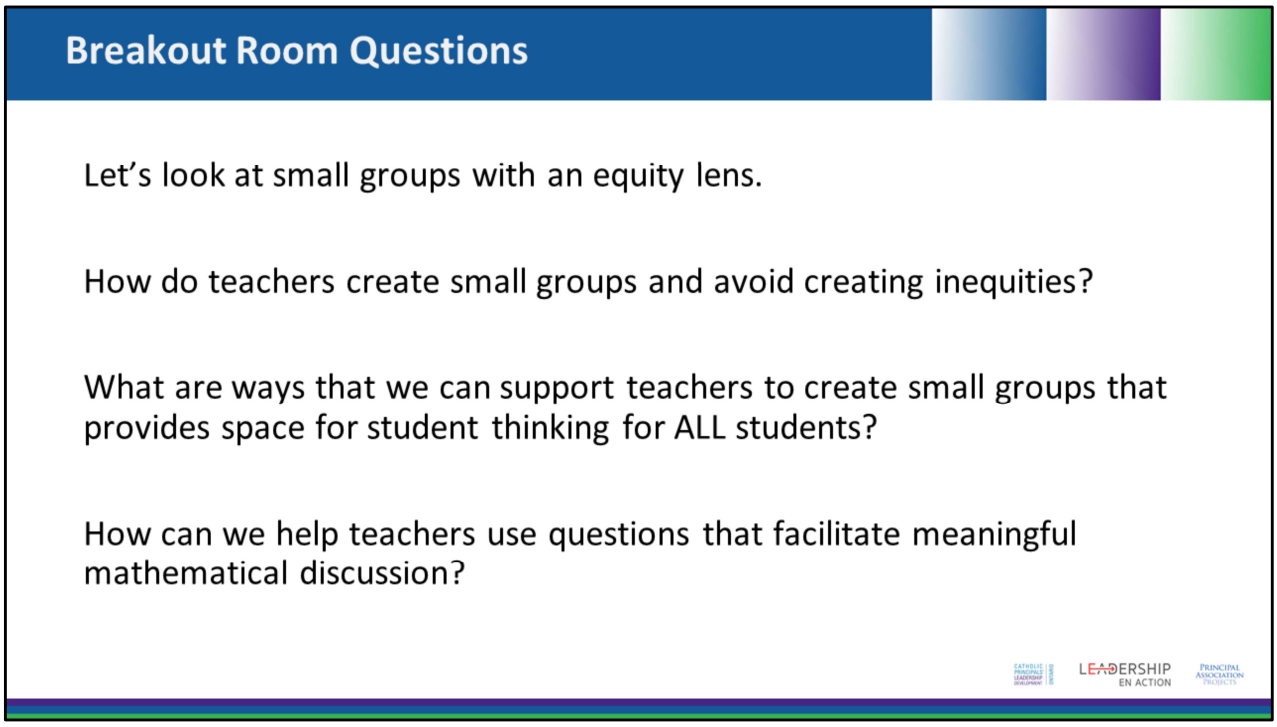


To recap:

These are the components of small groups in an effective math classroom (read slide)

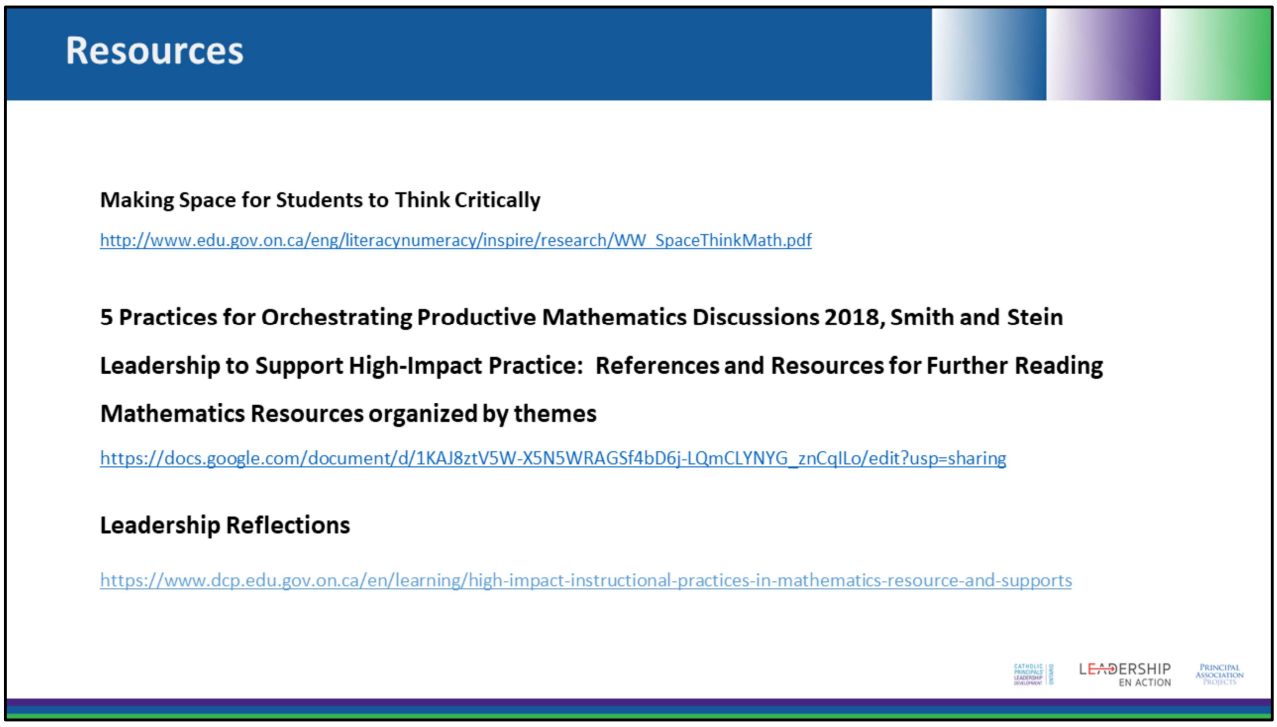


Let's look at small groups with an equity lens.

How do teachers create small groups and avoid creating inequities?

What are ways that we can support teachers to create small groups that provides space for student thinking for ALL students?

How can we help teachers use questions that facilitate meaningful mathematical discussion?



Highlight the resources that are available to principals-resources organized by themes

Leadership Reflections (video) (Thinking classroom, learning environment, vertical…, talk, critical thinkers, change in engagement, collaboration, how students learn, importance of timetable, coteach, learn from one another, teaching practices, coplanning, professional learning with different... , growth mindset)
https://www.dcp.edu.gov.on.ca/en/learning/high-impact-instructional-practices-in-mathematics-resource-and-supports

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