

# Using Discretionary Spaces in Teaching to Advance Students' Mathematical Flourishing

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Baltimore City Public Schools

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you!



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# Teaching is powerful.



## Understanding the power of the work of teaching

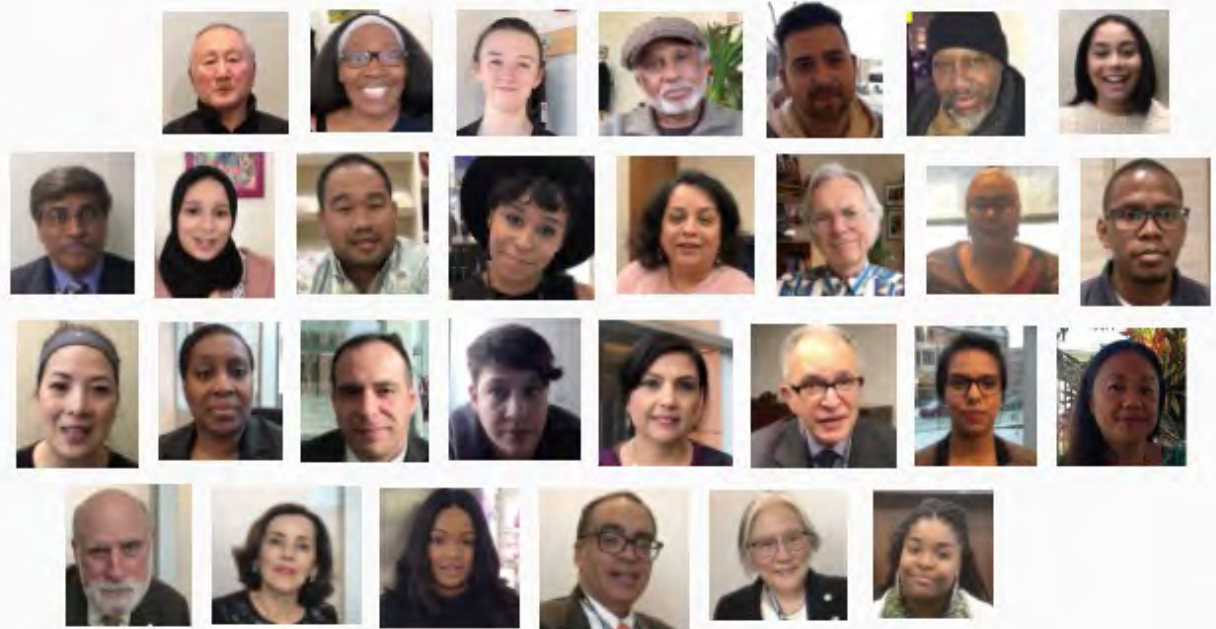
How is teaching powerful?

What are “discretionary spaces” and what makes them so powerful?

How can we better leverage the discretionary spaces in our work?



# 1. How is teaching powerful?



# Video: Is there a teacher who had a significant impact on you?



# Why does it matter when we don't pay attention to the actual work of teaching?

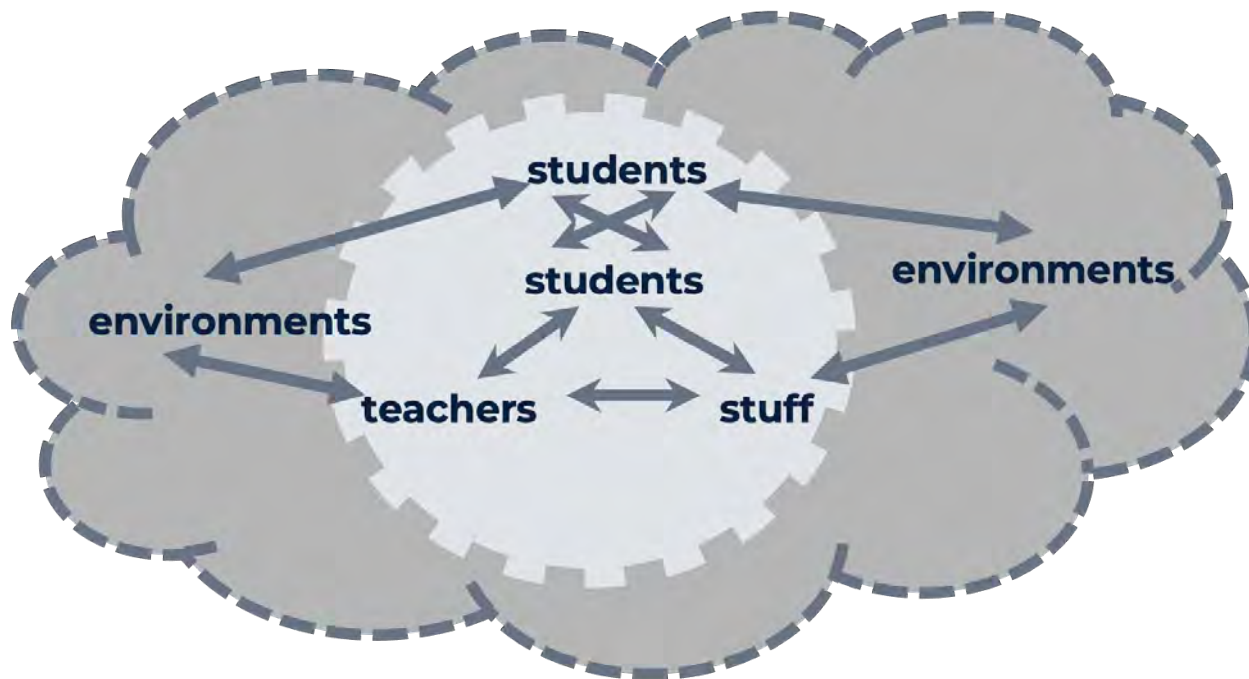


**We fail to connect the dots.**

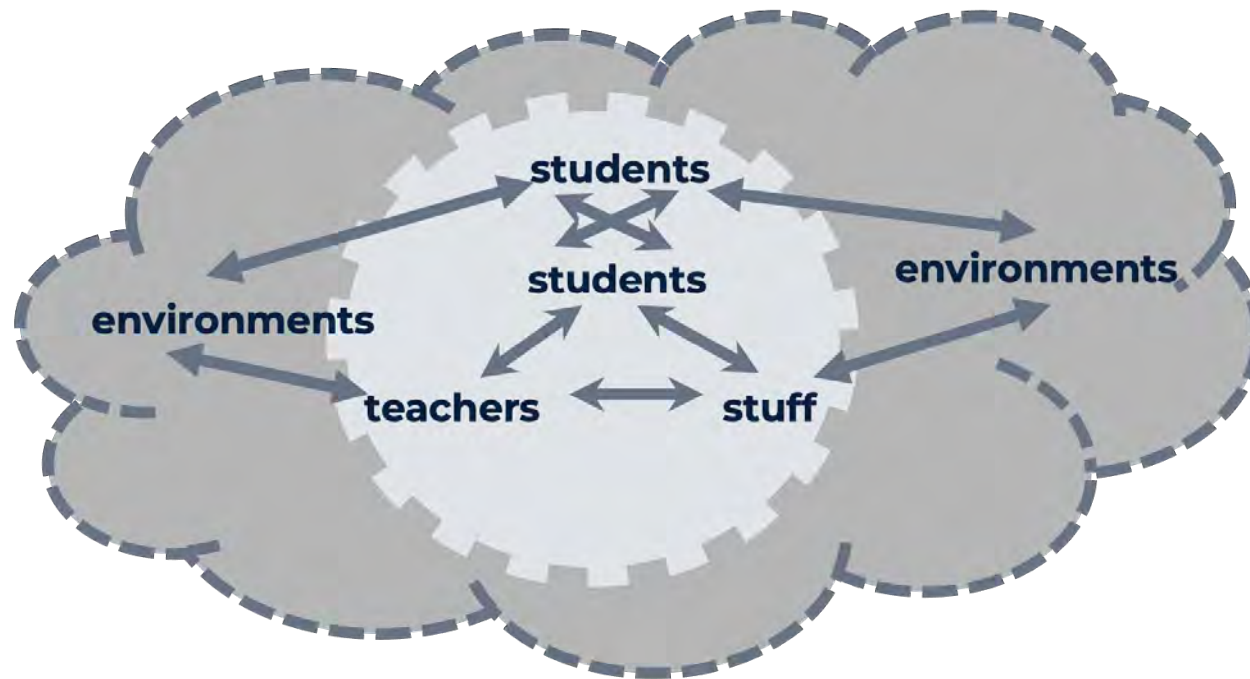
**And that means that our strategies often miss the mark of helping students flourish—and reproduce patterns of inequity and injustice.**



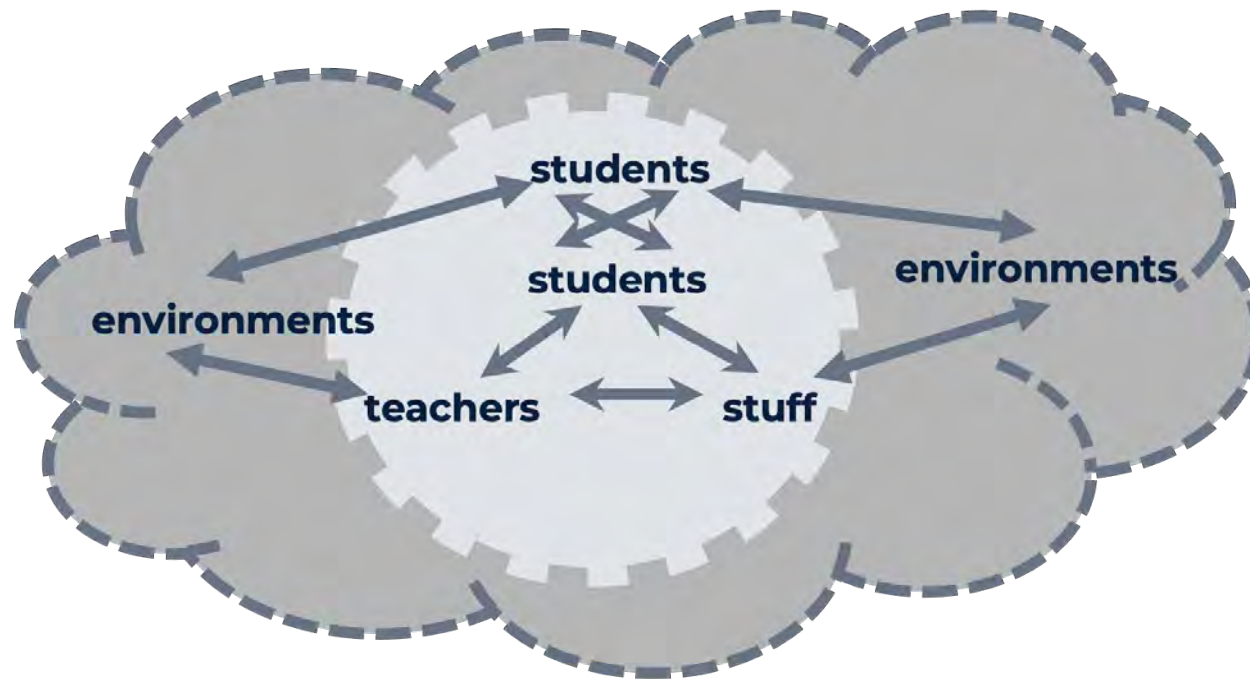




# 1. Teaching and learning are constructed interactively and are interpretive.



1. Teaching and learning are constructed interactively and are interpretive.
2. They take place within broad historical and socio-political environments.



# How do macro-level factors interact with practice?



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## Histories, policies, institutional systems

(e.g., institutional racism, history of intelligence as the property of white people, anti-Black “scientific” racism; legacies of violence against Black and Indigenous people)



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**&**

## **Taken-for-granted practices and norms**

(e.g., teachers’ judgments of students, who is positioned as “smart” or “struggling”; disproportional punishment and assignment to special ed and gifted programs)

## How do macro-level factors interact with practice?

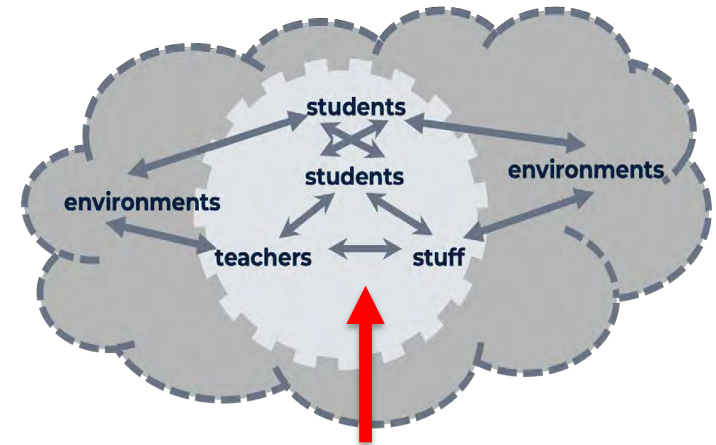
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### Taken-for-granted practices and norms

(e.g., teachers’ judgments of students, who is positioned as “smart” or “struggling”; disproportional punishment and assignment to special ed and gifted programs)



### The arrows run both ways.

The environments in which we are all steeped shape what we take for granted and do, but learning these as normal also reinforces their persistence.









1. **Teaching is powerful.** When it is done with care and judgment, students can thrive—learn content, develop positive identities, learn to value others and work collectively.
2. Teaching also involves **enormous discretion.**
3. How that discretion is exercised can either reinforce racialized and oppressive patterns of social, personal, and epistemic injustice and harm, or it can **disrupt these patterns.**



# How can we leverage the power of teaching?

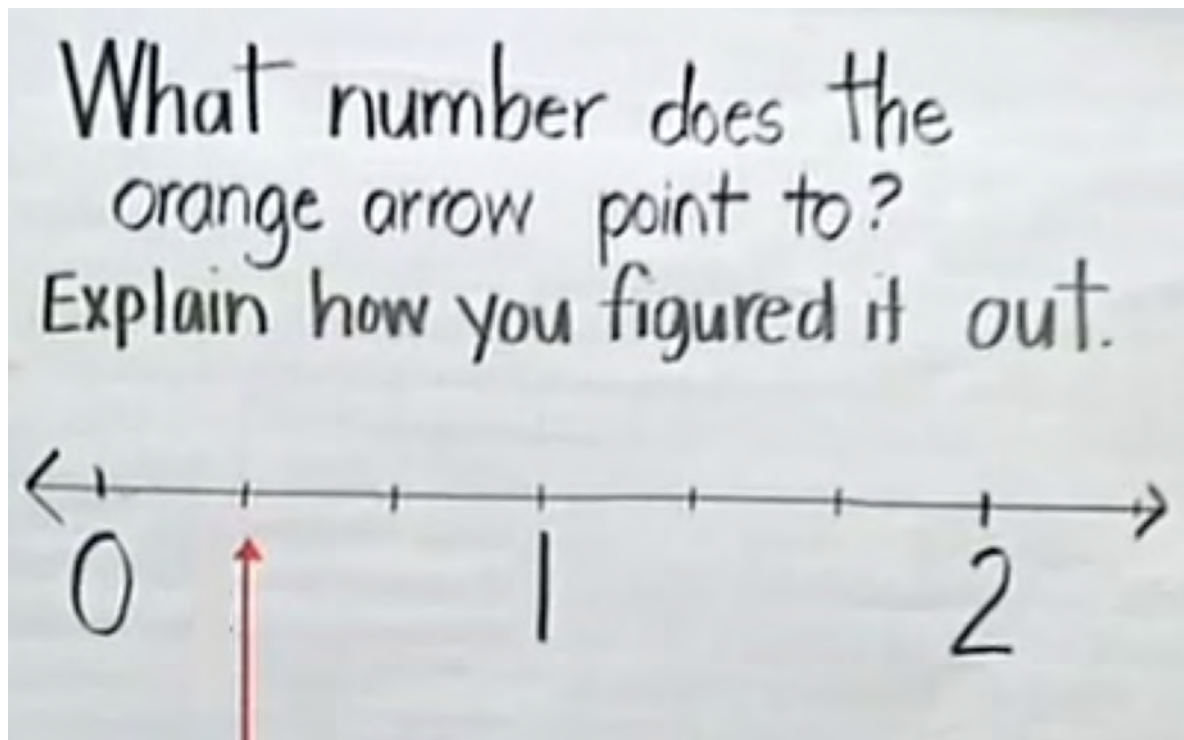


## Fractions as numbers: The instructional goal for student understanding

3.NF.2.a

Represent a fraction  $1/b$  on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into  $b$  equal parts. Recognize that each part has size  $1/b$  and that the endpoint of the part based at 0 locates the number  $1/b$  on the number line.







**Aniyah**



**Toni**



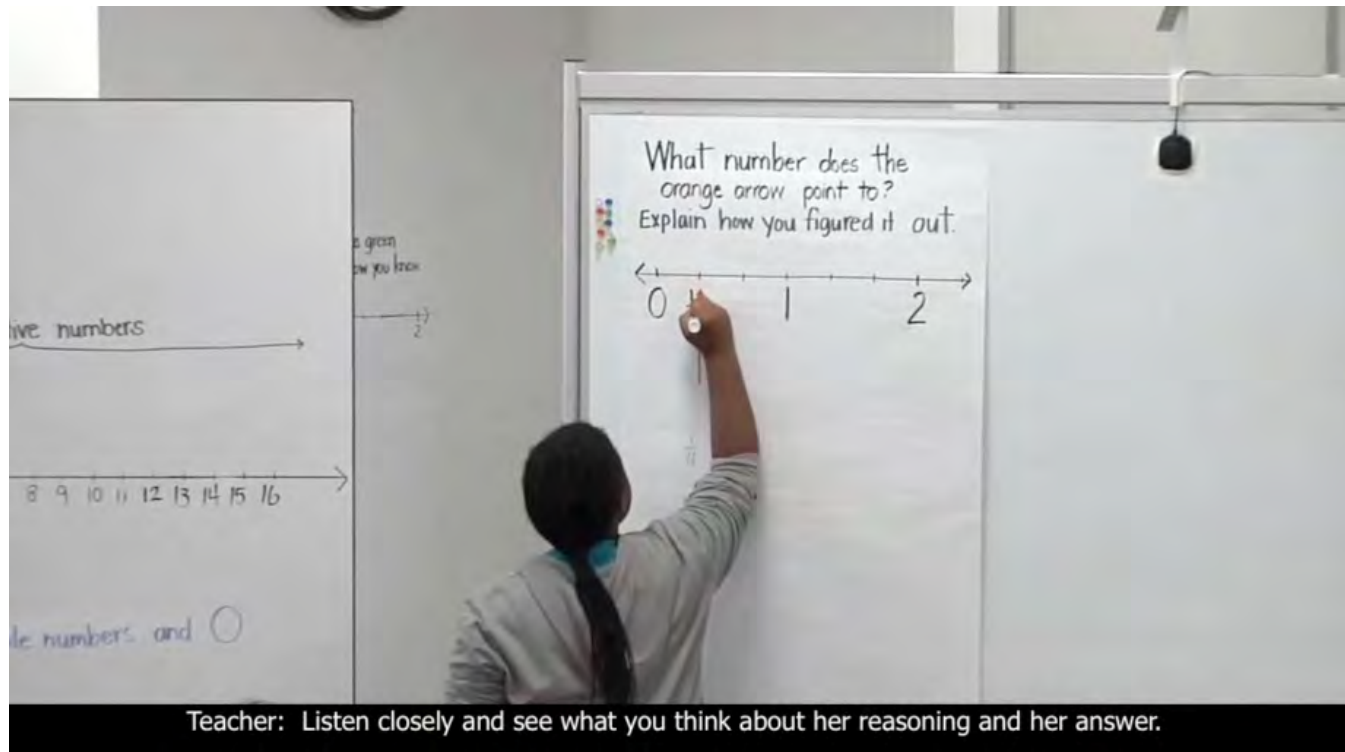
# Viewing focus

**What do you see about each girl's mathematical knowledge and skill?**





## Video: Aniyah and Toni



This video and additional supporting materials are available online [here](#).



# Discuss

**What do you see about each girl's mathematical knowledge and skill?**



What would  
happen  
next?

What are the  
possible  
results?



# In the next moment, what is likely to happen?

**NORMALIZED NEXT MOVES**

**RESULTS**



# In the next moment, what is likely to happen?

## NORMALIZED NEXT MOVES

- “Can someone help Aniyah out and show what we call the whole on the number line?”

## RESULTS

- Aniyah is excluded and her mathematical contributions are sidelined.



# In the next moment, what is likely to happen?

## NORMALIZED NEXT MOVES

- “Can someone help Aniyah out and show what we call the whole on the number line?”
- “Great, Aniyah, almost! But remember that the whole is from 0 to 1.”

## RESULTS

- Aniyah is excluded and her mathematical contributions are sidelined.
- Aniyah’s answer is signaled to be incorrect and she is positioned as not having contributed to the work.



# In the next moment, what is likely to happen?

## NORMALIZED NEXT MOVES

- “Can someone help Aniyah out and show what we call the whole on the number line?”
- “Great, Aniyah, almost! But remember that the whole is from 0 to 1.”
- “Thumbs up if you agree with Aniyah; thumbs down if you disagree.”

## RESULTS

- Aniyah is excluded and her mathematical contributions are sidelined.
- Aniyah’s answer is signaled to be incorrect and she is positioned as not having contributed to the work.
- Aniyah’s solution is “voted” on by her classmates.



# What else is likely?

**NORMALIZED NEXT MOVES**

**RESULTS**





# What else is likely?

## NORMALIZED NEXT MOVES

- “Toni, when you’re ready to participate appropriately by not playing with your hair and laughing, and have a question to ask, I will come back to you.”

## RESULTS

- Toni is publicly excluded from the discussion.



# What else is likely?

## NORMALIZED NEXT MOVES

- “Toni, when you’re ready to participate appropriately by not playing with your hair and laughing, and have a question to ask, I will come back to you.”
- “You need to be a better listener, Toni. Aniyah already explained why she picked one-seventh. Who else has a real question for Aniyah?”

## RESULTS

- Toni is publicly excluded from the discussion.
- Toni is judged to not be listening, her question is judged as not good, and she is excluded from the discussion.



# What else is likely?

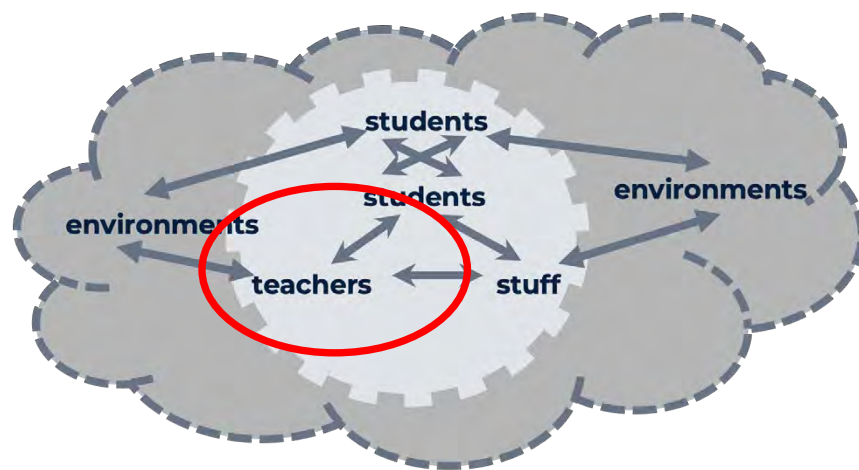
## NORMALIZED NEXT MOVES

- “Toni, when you’re ready to participate appropriately by not playing with your hair and laughing, and have a question to ask, I will come back to you.”
- “You need to be a better listener, Toni. Aniyah already explained why she picked one-seventh. Who else has a real question for Aniyah?”
- “In this classroom, we are respectful of one another. When you are ready to be respectful, you can rejoin the discussion, Toni.”

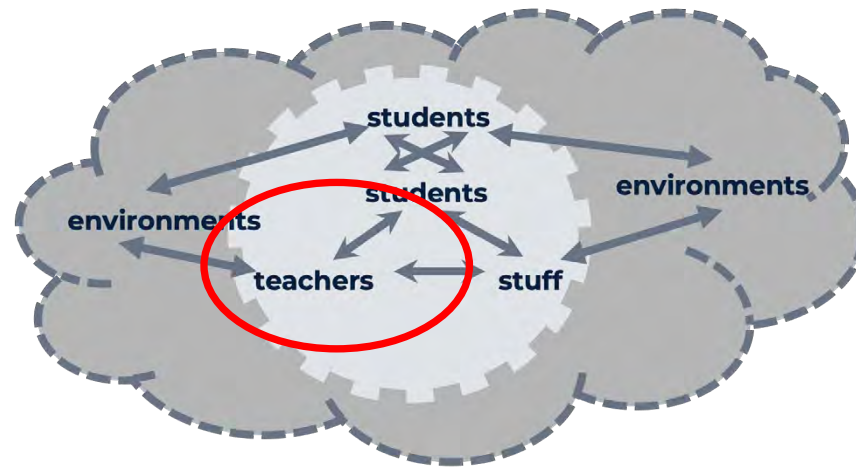
## RESULTS

- Toni is publicly excluded from the discussion.
- Toni is judged to not be listening, her question is judged as not good, and she is excluded from the discussion.
- Toni is publicly named and shamed as “disrespectful,” rebuked, and her role in advancing the mathematics is sidelined.

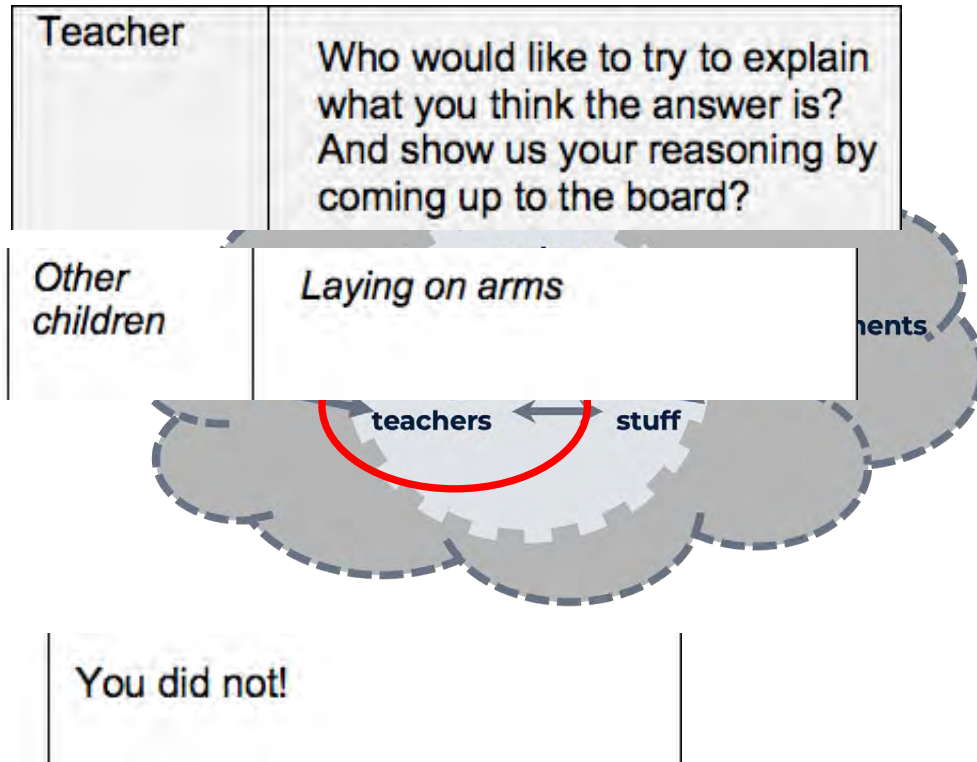




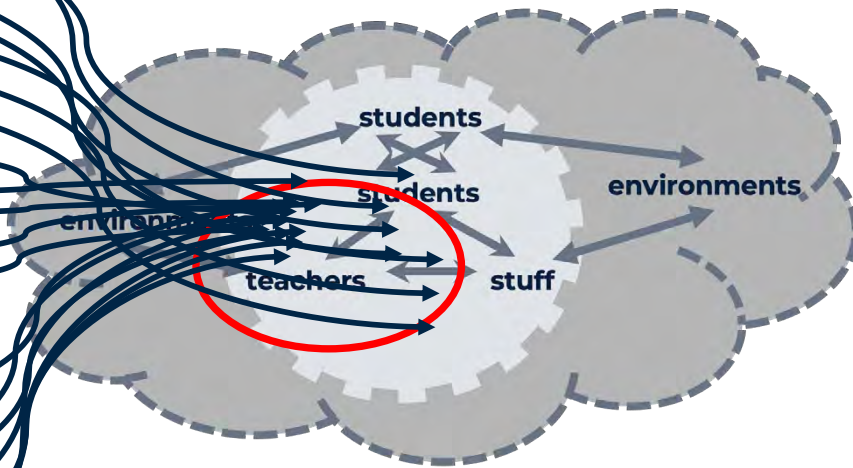
Speaker	Talk	Discretionary space
Teacher	Who would like to try to explain what you think the answer is? And show us your reasoning by coming up to the board?  Who'd like to come up to the board and try to tell-  And you know, it might not be right. That's okay because we're learning something new.  I'd like someone to come up and sort of be the teacher and explain how you are thinking about it. Who'd like to try that this morning?	1. Deciding when to open whole-group discussion 2. Deciding what to do to launch discussion 3. Framing the expectation for presenting 4. Framing of what it "coming to the board" entails
Teacher	Okay, Anyiah?	5. Selecting a student to present
Toni	Playing with hair	6. Deciding whether to comment
Other children	Laying on arms	7. Deciding whether to comment
Teacher	When someone's presenting at the board, what should you be doing?	8. Setting norms for what to do when a student is presenting
Students in chorus	Looking at them.	
Teacher	Looking at that person.	9. Responding to students
Teacher	Uh-huh?	10. Taking up an individual student question
Anyiah	You want me to write it?	
Teacher	You're trying to mark what you think this number is and explain how you figured it out.	11. Clarifying task
Teacher	Listen closely and see what you think about her reasoning and her answer. (Anyiah writes $\frac{1}{7}$ by the orange line).	12. Setting task for the other students
Anyiah	I put one-seventh because there's-	
Toni	Did she say one-seventh?	13. Responding to student
Anyiah	(turns to Toni) Yeah... (continues to class) Because there's seven equal parts, like one, two, three, four, five, six, and then seven. (Uses her fingers to count the parts on the number line).	
Teacher	Before you agree or disagree, I want you to ask questions if there's something you don't understand about what she did. No agreeing and disagreeing. Just. All you can do right now is ask Anyiah questions. Who has a question for her?	14. Setting task for responding to student explanation
Teacher	Okay, Toni, what's your question for her?	15. Selecting student to speak
Dante	You did not!	16. Responding to student speaking across room
Toni	Why did- (laughs at another student who says something to her from across the room)	17. Responding to student laughing
Teacher	Go ahead, it's your turn.	17. Responding to student laughing
Toni	Why did you pick one-seventh?	
Dante	You did not!	18. Responding to student speaking across room
Teacher	Let's listen to her answer now. That was a very good question.	19. Setting task for class 20. Responding to student



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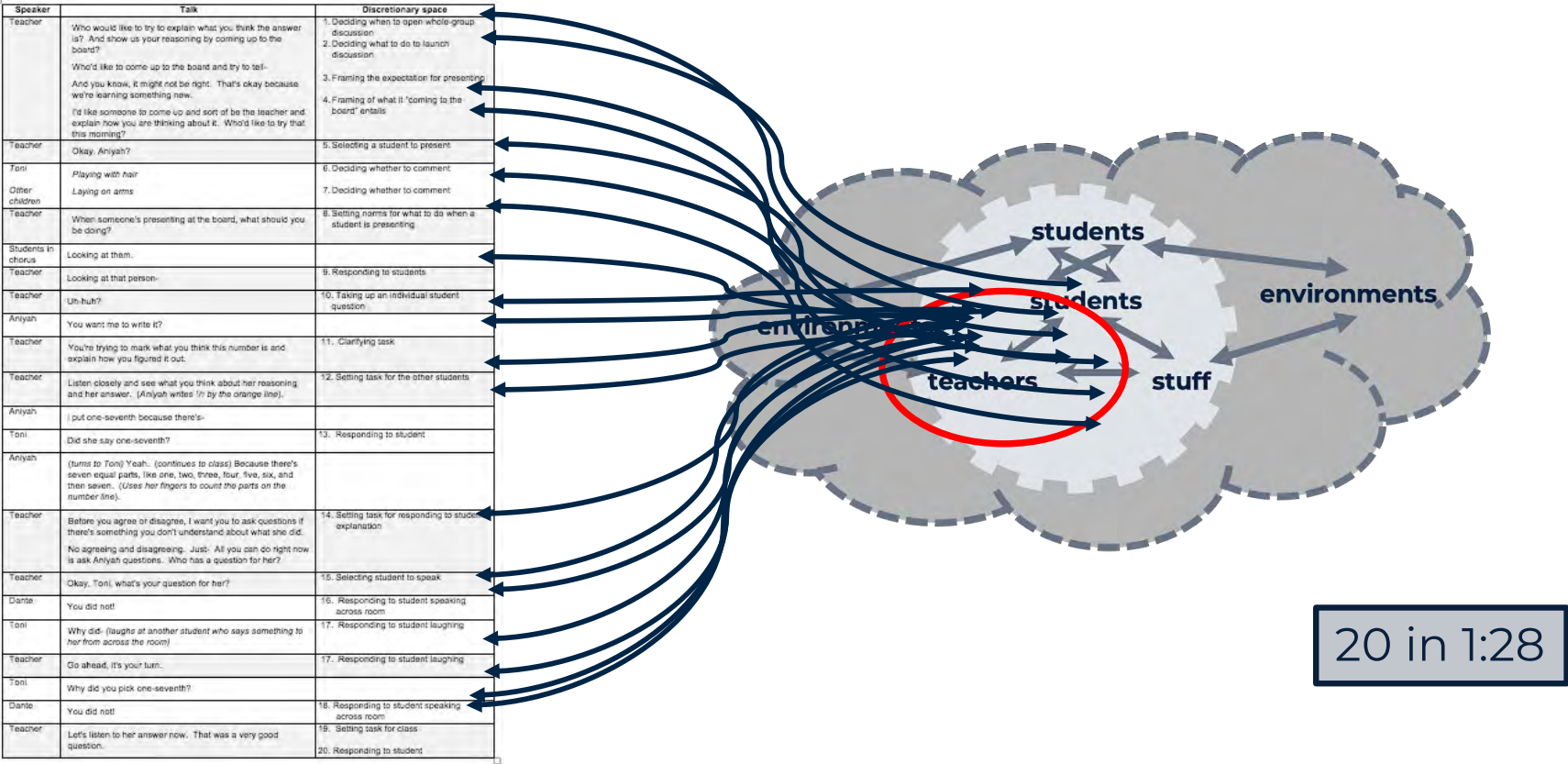
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20 in 1:28



# Teaching is dense with “discretionary spaces”



20 in 1:28



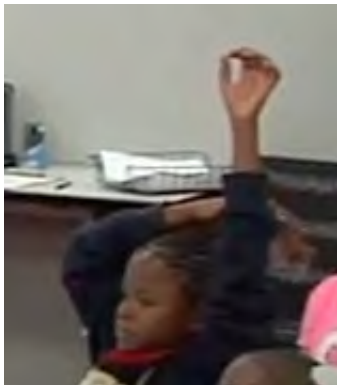


## Video: Aniyah and Toni



This video and additional supporting materials are available online [here](#).

# Using discretionary spaces with care



- Interpreting Toni as asking a real question that she means.
- Hearing Toni's question as central to advancing the mathematical content.
- Reinforcing her mathematical identity, not choosing to read her body as disruptive.

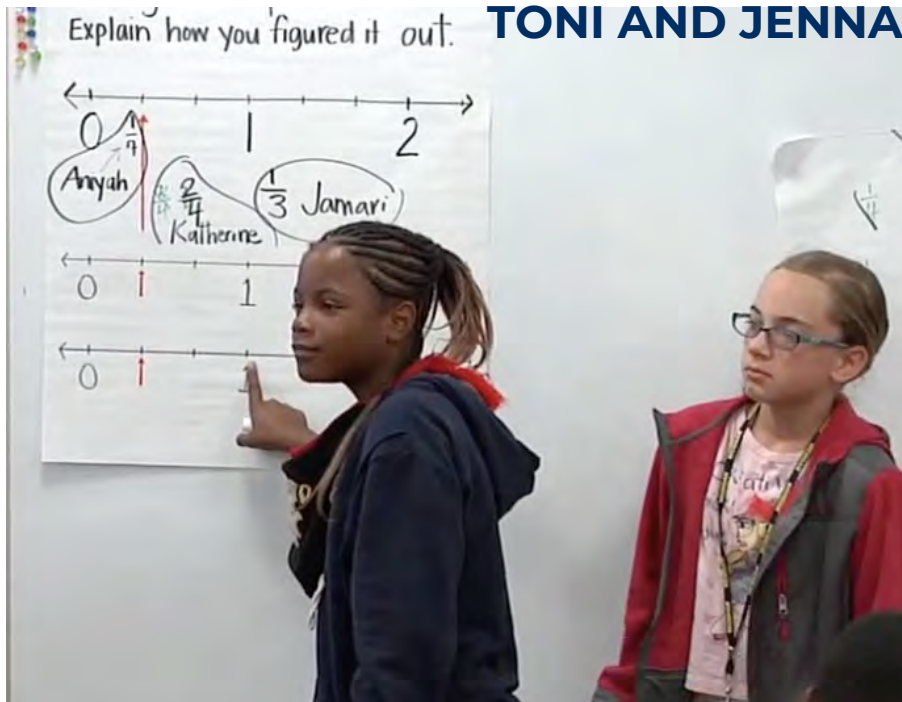


- Other children hear Aniyah as getting the discussion going, and Toni as asking an important mathematical question.
- Aniyah and Toni are both positioned as contributing to the discussion.
- Children see a teacher attending to Black girls as mathematical thinkers and contributors to collective work.



- Interpreting Aniyah as competent to answer questions about her ideas.
- Hearing Aniyah's explanation as central to advancing the mathematical content.
- Reinforcing her mathematical identity, not choosing to read her body as struggling.

# 14 minutes after where we stopped



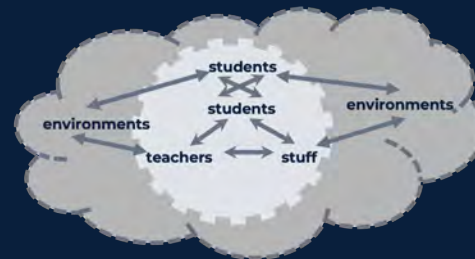
## ANIYAH

I did well on my goal today because my goal was to to share my ideas with the class and I did I went up to the board and share my idea with the class on Fractions.

**AND:** On an “exit ticket,” 28 of the children were able to correctly identify a different fraction ( $\frac{2}{5}$ ) on the number line.



# What does it take to disrupt the patterns that marginalize and reinforce racism?



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- Seeing Aniyah's explanation and Toni's question as key to the class's work

Gholson & Martin, 2014; Langer-Osuna, 2015, 2017; Leonard & Martin, 2013; Martin, 2012, 2015

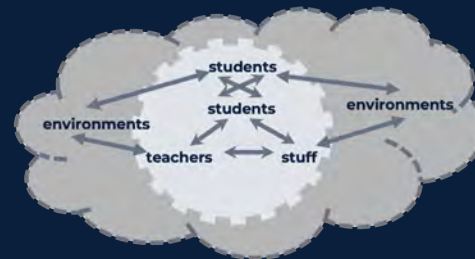


# What does it take to disrupt the patterns that marginalize and reinforce racism?



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- Taking as axiomatic the brilliance of Black children, and thus Toni and Aniyah

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Knowing and using mathematics in teaching (MKT)

Interpreting Toni as asking a mathematical question that she means

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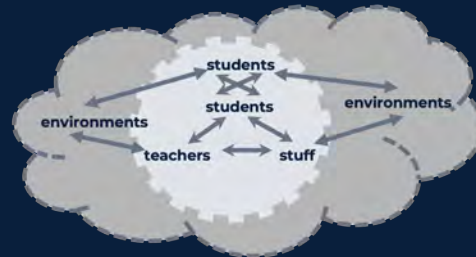


- Seeing Aniyah's explanation and Toni's question as key to the class's work
- Taking as axiomatic the brilliance of Black children, and thus Toni and Aniyah
- ... AND having something different to DO

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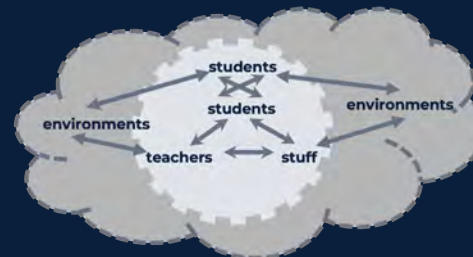


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Knowing and using mathematics in teaching (MKT)

Interpreting Toni as asking a mathematical question that she means

Having a repertoire of practices that can be adapted and used in contexts



Gholson & Martin, 2014; Langer-Osuna, 2015, 2017; Leonard & Martin, 2013; Martin, 2012, 2015



**Discretionary spaces** lie in the many, many moment-to-moment moves, uses of language, and decisions that are inevitable in practice.

These are both crucial resources for supporting students and also where harm happens.

What would it take to learn to use the discretionary spaces in teaching in ways that advance students' mathematical flourishing?



# Using the power of discretionary spaces to support BCPS learners

Where are high-leverage discretionary spaces in teaching mathematics that matter for students' mathematical flourishing?

Where are the discretionary spaces in YOUR work that matter for students' mathematical flourishing?



# Where are high-leverage discretionary spaces in **teaching mathematics** that matter for students' mathematical flourishing?



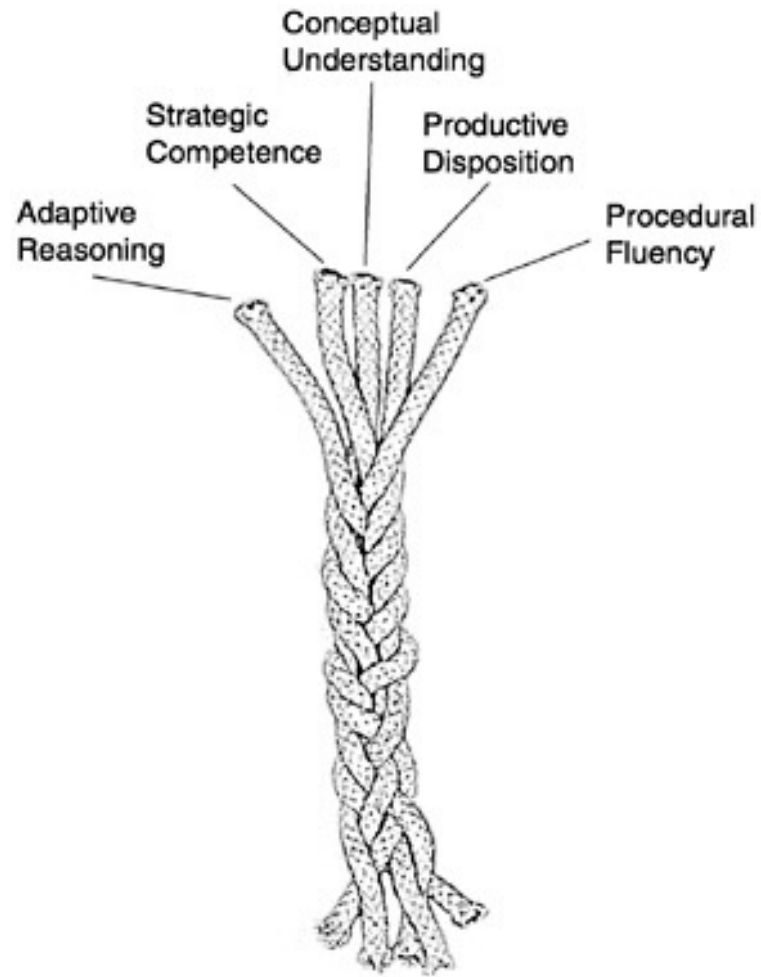
1. Developing understanding of core concepts, procedural fluency, mathematical reasoning, and automaticity
2. Adapting the curriculum for your students
3. Using language to explain to students

# Inherent discretionary spaces in teaching



# 1. Developing understanding of core concepts and procedures, mathematical reasoning, and automaticity







**You have  
1 minute.**

**B**

Addition Crossing a Ten

1.	$28 + 1 =$	
2.	$37 + 2 =$	
3.	$46 + 3 =$	
4.	$55 + 4 =$	
5.	$21 + 8 =$	
6.	$32 + 7 =$	
7.	$43 + 6 =$	
8.	$54 + 5 =$	
9.	$39 + 1 =$	
10.	$39 + 2 =$	
11.	$39 + 3 =$	
12.	$39 + 5 =$	
13.	$48 + 2 =$	
14.	$48 + 3 =$	
15.	$48 + 4 =$	
16.	$48 + 6 =$	
17.	$57 + 3 =$	
18.	$57 + 4 =$	
19.	$57 + 5 =$	
20.	$57 + 7 =$	
21.	$75 + 5 =$	
22.	$75 + 6 =$	

Number Correct: \_\_\_\_\_

Improvement: \_\_\_\_\_

23.	$75 + 7 =$	
24.	$75 + 9 =$	
25.	$66 + 4 =$	
26.	$66 + 5 =$	
27.	$66 + 6 =$	
28.	$66 + 9 =$	
29.	$54 + 6 =$	
30.	$54 + 7 =$	
31.	$54 + 8 =$	
32.	$33 + 7 =$	
33.	$33 + 8 =$	
34.	$33 + 9 =$	
35.	$42 + 8 =$	
36.	$42 + 9 =$	
37.	$49 + 1 =$	
38.	$49 + 3 =$	
39.	$58 + 2 =$	
40.	$58 + 4 =$	
41.	$67 + 3 =$	
42.	$67 + 5 =$	
43.	$85 + 5 =$	
44.	$85 + 8 =$	

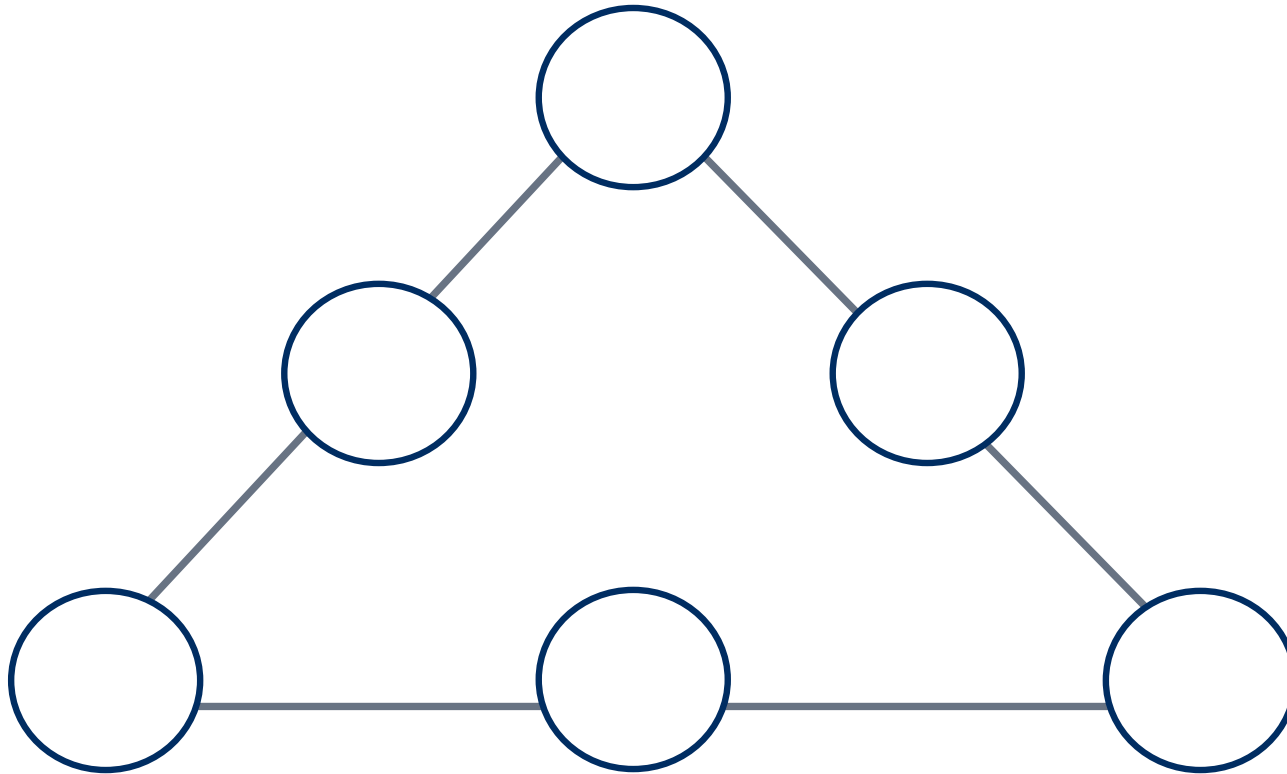


# The 8's Problem

**Write down as many 8's as you want in a row. Insert plus (+) signs between them so that the expression equals 1000.**

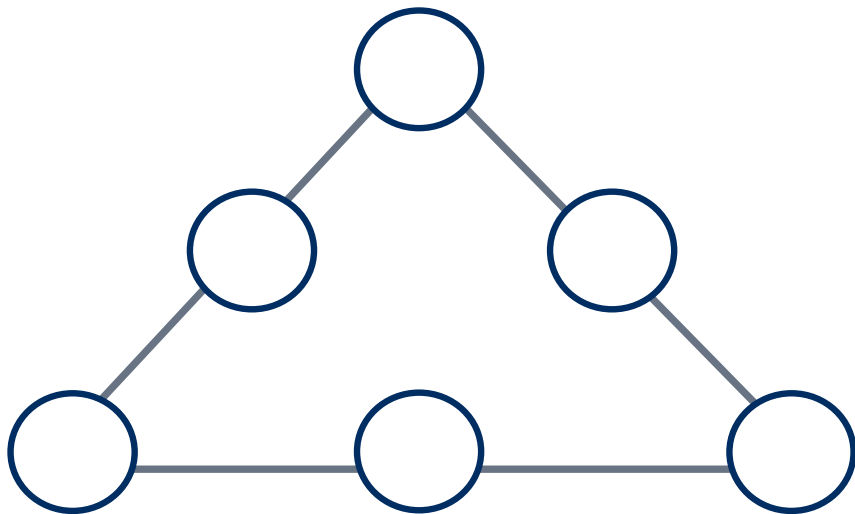
(You can put 8s together, e.g., 88.)

**How many ways can you do this?** Prove that you have found them all.



**Place the numbers 1, 2, 3, 4, 5, and 6 in the circles, using each number exactly once.**

**Place them so that when you add up the values in the three circles on each of three sides of the triangle, they total the same sum.**



How many different solutions are there? Prove that you have found them all.

# Compare the three tasks.

1. What mathematical knowledge and skills did each require of you?
2. What sorts of practice did each offer you?
3. Which were more challenging?

Sprint Addition  
Across Ten

8's Problem

Magic Triangle

B		Number Correct: _____	
Addition Crossing a Ten		Improvement: _____	
1.	$28 + 1 =$	23.	$75 + 7 =$
2.	$37 + 2 =$	24.	$75 + 9 =$
3.	$46 + 3 =$	25.	$66 + 4 =$
4.	$55 + 4 =$	26.	$66 + 5 =$
5.	$21 + 8 =$	27.	$66 + 6 =$
6.	$32 + 7 =$	28.	$66 + 9 =$
7.	$43 + 6 =$	29.	$54 + 6 =$
8.	$54 + 5 =$	30.	$54 + 7 =$
9.	$39 + 1 =$	31.	$54 + 8 =$
10.	$39 + 2 =$	32.	$33 + 7 =$
11.	$39 + 3 =$	33.	$33 + 8 =$
12.	$39 + 5 =$	34.	$33 + 9 =$
13.	$48 + 2 =$	35.	$42 + 8 =$
14.	$48 + 3 =$	36.	$42 + 9 =$
15.	$48 + 4 =$	37.	$49 + 1 =$
16.	$48 + 6 =$	38.	$49 + 3 =$
17.	$57 + 3 =$	39.	$58 + 2 =$
18.	$57 + 4 =$	40.	$58 + 4 =$
19.	$57 + 5 =$	41.	$67 + 3 =$
20.	$57 + 7 =$	42.	$67 + 5 =$
21.	$75 + 5 =$	43.	$85 + 5 =$
22.	$75 + 6 =$	44.	$85 + 8 =$



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## Discretionary space #1:

# Developing understanding of core concepts and procedures, mathematical reasoning, and automaticity

Identify, develop, and construct alternative resources for combining these key mathematical goals

## 2. Adapting the curriculum for one's own students



# Multi-step word problems

**Why are these important?**

**What are the challenges?**





# Multi-step word problems

## Why are these important?

- They are the types of problems that we more often face in everyday life
- They integrate different aspects of mathematical knowledge, procedural skill, and reasoning
- They are common on assessments

## What are the challenges?



# Multi-step word problems

## Why are these important?

- They are the types of problems that we more often face in everyday life
- They integrate different aspects of mathematical knowledge, procedural skill, and reasoning
- They are common on assessments

## What are the challenges?

- Reading and interpreting the stories or situations
- Making sense: Problems in instructional materials are often not culturally relevant or do not make sense
- Language is often careless, even in high-quality instructional materials and on assessments



Mia has 152 beads. She uses some to make bracelets. Now there are 80 beads. If she uses 8 beads for each bracelet, how many bracelets does she make?



Mia has 152 beads. She uses some to make bracelets. Now there are 80 beads. If she uses 8 beads for each bracelet, how many bracelets does she make?

**What are some issues with this problem?**

Mia has 152 beads. She uses some to make bracelets. Now there are 80 beads. If she uses 8 beads for each bracelet, how many bracelets does she make?

### What are some issues with this problem?

- What is the question referring to? The first set of bracelets? The second? Altogether?
- Is this a realistic situation?
- Are there students for whom this would be unfamiliar?

# Revising word problems to manage these issues

- Understanding all the mathematics that is embedded in the word problem
- Maintaining the same mathematics
- Knowing contexts that would provide more relevance and make sense
- Using language with care

Mia has 152 beads. She uses some to make bracelets. Now there are 80 beads. If she uses 8 beads for each bracelet, how many bracelets does she make?

Mia has 152 beads. She uses some to make bracelets. Now there are 80 beads. If she uses 8 beads for each bracelet, how many bracelets does she make?

**#1** The third graders baked 152 cookies to take to a nursing home. Their teacher already took some cookies over to the home and now there are 80 cookies left. If they pack 8 cookies in each box, how many boxes can they pack?

**#2** 152 children go to Park School. It is pizza day and each child will get one slice of delicious pizza. The K–2 classes have already eaten their pizza. There are 10 pizzas left and each one is cut into 8 slices. If there are 80 children in the upper classes, is there enough pizza for everyone to have a slice?

# Appraising revised problems

- Does the new problem preserve the mathematical structure and goals of the original problem?
- Is the new problem more relevant and sensible for my students?
- Is the language of the new problem free of unintended confusion or unknown ideas or words?





Mia has 152 beads. She uses some to make bracelets. Now there are 80 beads. If she uses 8 beads for each bracelet, how many bracelets does she make?

**#1** The third graders baked 152 cookies to take to a nursing home. Their teacher already took some cookies over to the home and now there are 80 cookies left. If they pack 8 cookies in each box, how many boxes can they pack?

**Appraise each of these possible revisions. Make your own.**

**#2** 152 children go to Park School. It is pizza day and each child will get one slice of delicious pizza. The K–2 classes have already eaten their pizza. There are 10 pizzas left and each one is cut into 8 slices. If there are 80 children in the upper classes, is there enough pizza for everyone to have a slice?

## Discretionary space #2: Adapting the curriculum for one's own students

Work collaboratively to revise lessons, problems, exit tickets to preserve the mathematical goals but be more relevant and sensible for one's own students



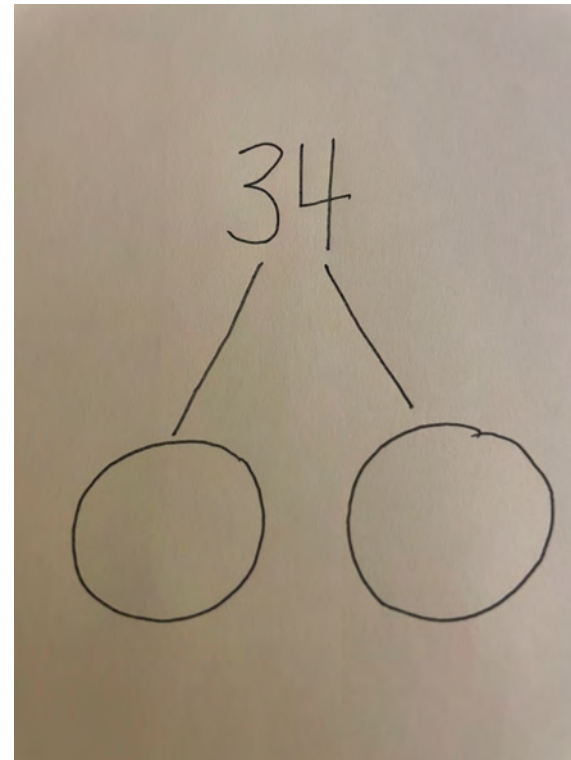
## 3. Using language to explain to students



## Even with a scripted curriculum, teachers have to say and explain things.

Significant mathematical slips are likely, which inadvertently “misteach.”

How many  
tens?



## What is wrong with each of these common statements?

An even number is a number with 0, 2, 4, 6, or 8 in the ones place.

Multiplying makes things bigger.

When we subtract, we take away.

To multiply by 10, just add a zero.

## Discretionary space #3: Using language to explain to students

- Have opportunities to practice around common habits of language that create misunderstanding.
- Develop more awareness of this risk.
- Practice developing helpful ways to explain things that do not distort.



# Where are the discretionary spaces in **YOUR work** that matter for students' mathematical flourishing?



- Ensuring pacing and coverage/going in depth
- Test taking skills/developing understanding and fluency
- Following the scripted curriculum/adapting to students
- Emphasizing test scores/developing positive mathematical identities

## Dilemmas and tensions and your discretionary spaces



# BCPS goals

- To improve district mathematical performance
- To support students to develop mathematical competence and positive mathematical identities



# How do you use your discretionary spaces in your leadership practice?

- How do you lead in ways to manage these dilemmas and tensions?
- What signals do you send to teachers about each of these?

- Ensuring pacing and coverage/going in depth
- Test taking skills/developing understanding and fluency
- Following the scripted curriculum/adapting to students
- Emphasizing test scores/developing positive mathematical identities



# THANK YOU!



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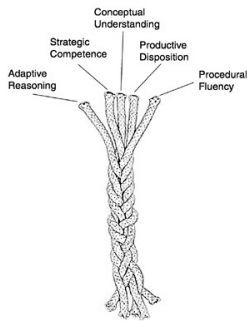


Image on slide 56:

"The strands of mathematical proficiency." National Research Council. 2001. *Adding It Up: Helping Children Learn Mathematics*. Washington, DC: The National Academies Press. doi: 10.17226/9822.