Educator Professional Development Session

Reimagining Math Assessments to Engage and Empower ELL Students

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INTRODUCTION

Dr. Yesmi Rios

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RESEARCH

Objective: To improve the way teachers assess students in math classrooms

Action: Developing new assessment tools and strategies that will:

- Give teachers actionable information
- Focus on students' assets, not deficits
- Work with existing curricula and materials
- Teach students to think like mathematicians
- Maintain the level of critical thought and not undermine standard language and learning standards.

Presentation Objectives

PRESENTATION OBJECTIVES

- Explain why math and math assessments are difficult for ELLs
- Discuss *mathematician prompts* and how prompts may improve math assessments and student performance.
- Practice writing *mathematician prompts* to experience the process.

Turn and Talk

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Language and Math Performance?

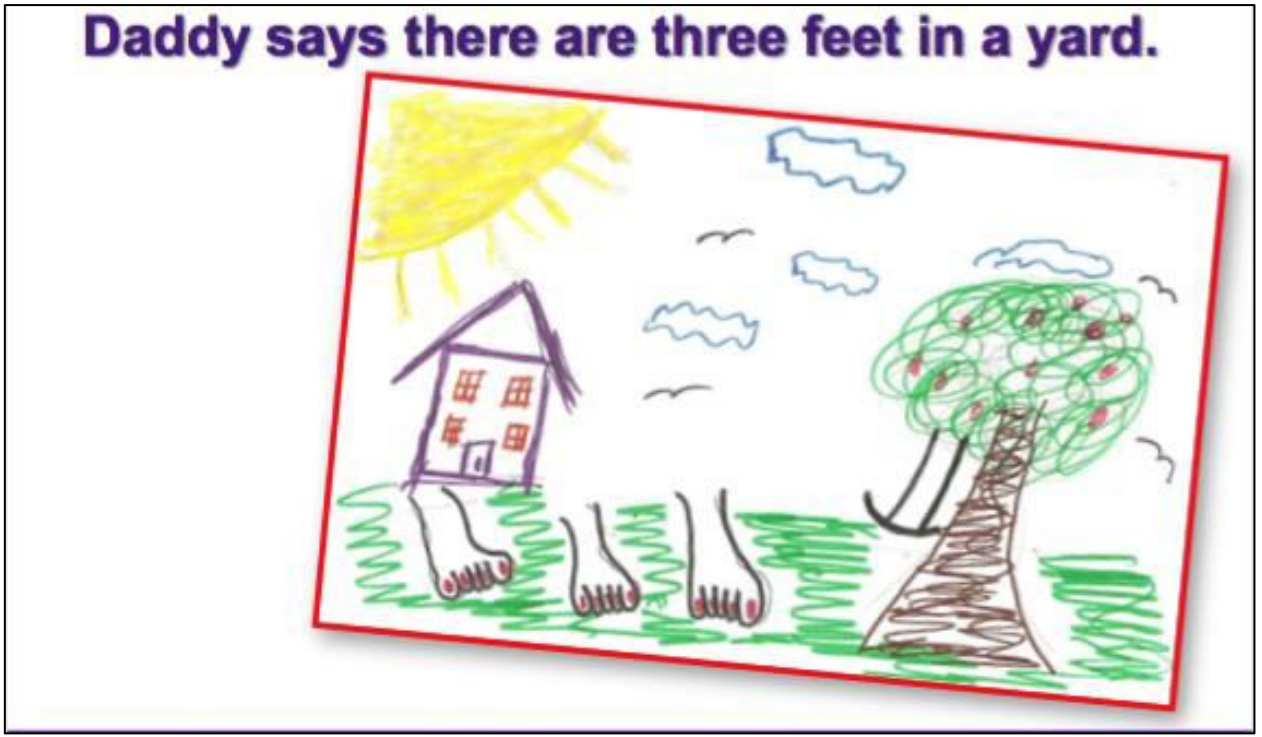
THE THREE-LEGGED STOOL

Conceptual Understanding

Procedural Skill and Fluency

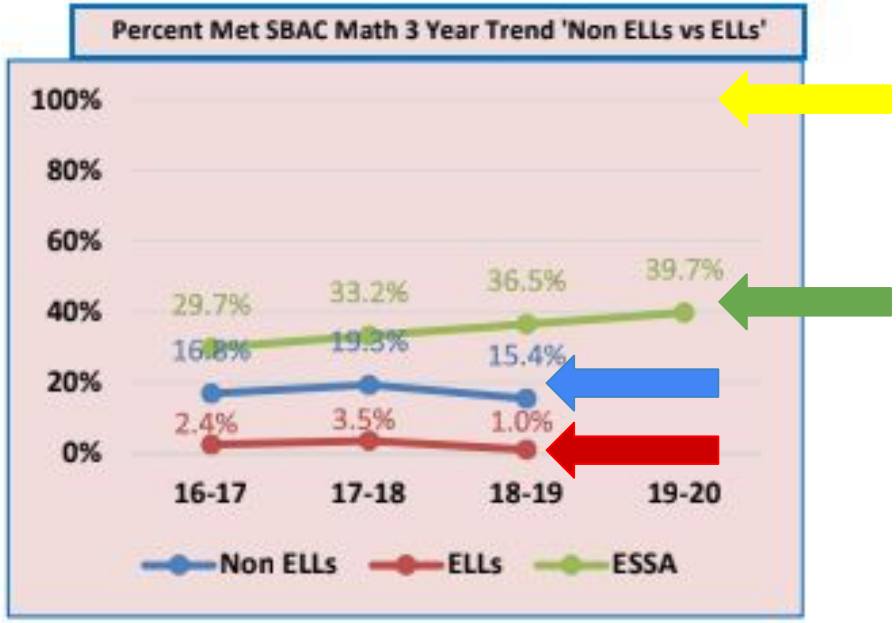
Application

DOES LANGUAGE IMPACT MATH PERFORMANCE?



Total Enrollment	ELL Active Enrollment	LTEL Enrollment	Newcomer Enrollment
1,421	343	244	11
Monitored Enrollment	Total NSPF Points	NSPF Star Rating	NSPF ELL Points
315	20	1	3

SBAC Math Data Results for a Middle School



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CONSIDER

When we ask ELL students to do math, we we are asking them to:

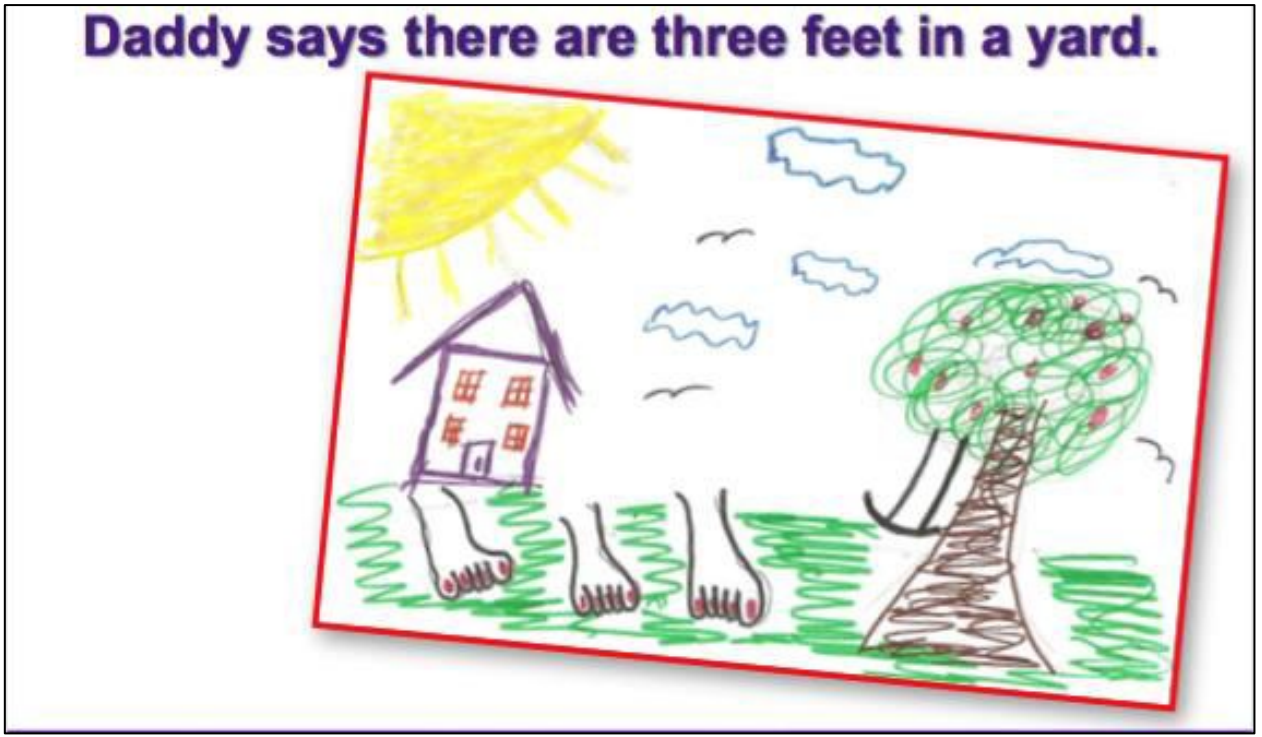
- Be familiar with and competent in English
- Simultaneously comprehend and process information in English and the language of mathematics
- Use information to complete required mathematical task.
- Effortlessly switch between the language of English and math; which require strong linguistic and metalinguistic skills.

THREE IMPORTANT AREAS WHERE LANGUAGE IS NEEDED IN MATH

- Word problems
- Learning new concepts
- Explaining or teaching math to others

All three require: understanding linguistic features, vocabulary, reading and writing

DOES LANGUAGE IMPACT MATH PERFORMANCE?



The Impact of Language Skills

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LANGUAGE DOMAINS

RECEPTIVE LANGUAGE	PRODUCTIVE LANGUAGE
 Listening	 Speaking
 Reading	 Writing

LEGAL OBLIGATIONS TO ELLs OFFICE FOR CIVIL RIGHTS

School districts must ensure that ELLs can participate meaningfully and equally in educational programs and services.

IMPACTS

- Student's belief and confidence in their ability to learn math
- Student motivation
- Student's ability to understand and apply math principles and procedures

*These are immediate and long term effects

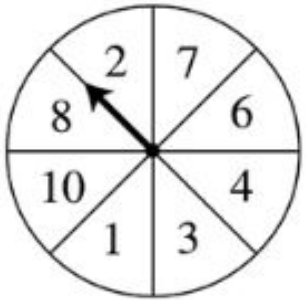
ELLs and Math Assessments

ELLS AND ASSESSMENTS

To win a game, Tamika must spin an even number on a spinner identical to the one shown below.

Are Tamika's chances of spinning an even number certain, likely, unlikely, or impossible?

A. certain
B. likely
C. unlikely
D. impossible



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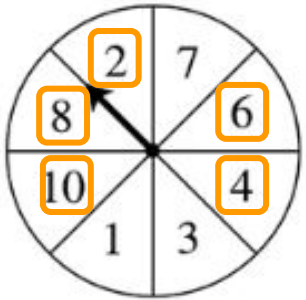


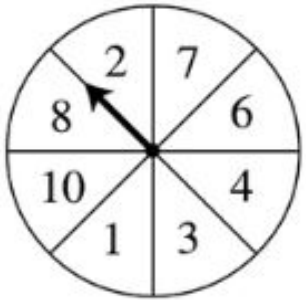
ELLS AND ASSESSMENTS

To win a game, [redacted] must [redacted] an [redacted] number on a [redacted] to the one [redacted].

Are [redacted]'s chances of [redacted] an [redacted] number [redacted], likely, unlikely, or [redacted]?

[redacted]

B. likely
C. unlikely
[redacted]



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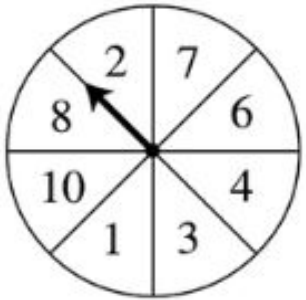
[redacted]

B. likely
C. unlikely
[redacted]



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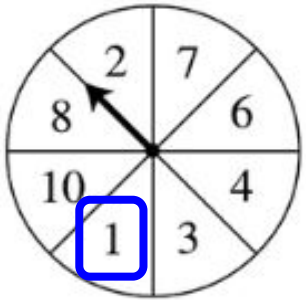

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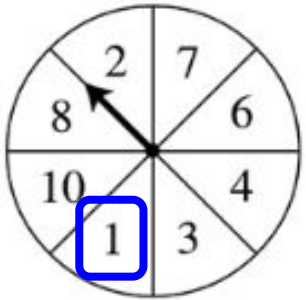
[redacted]

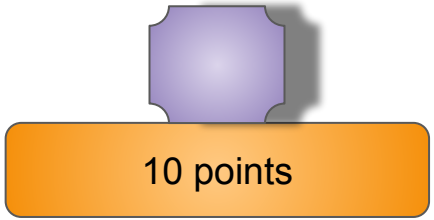
B. likely

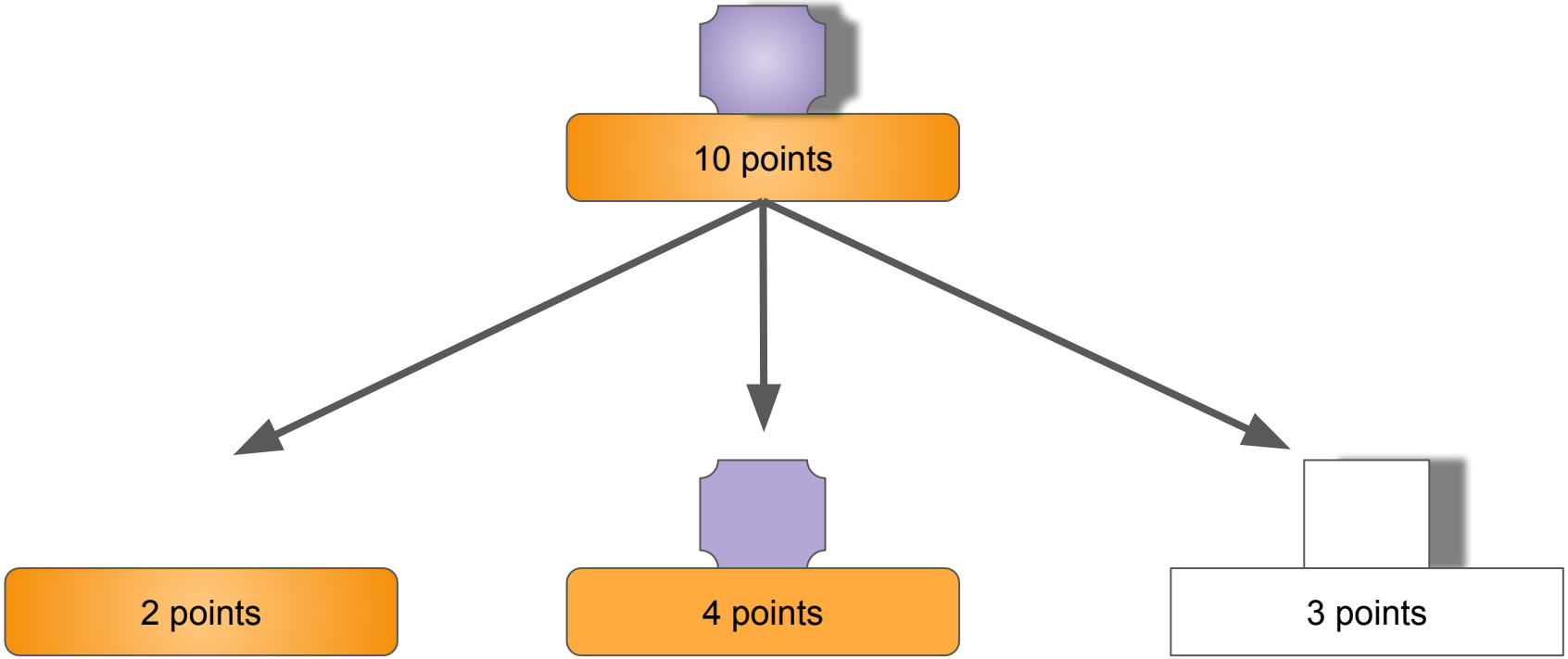
C. unlikely

[redacted]



Mathematician’s prompts


10 points


10 points
2 points
4 points
3 points

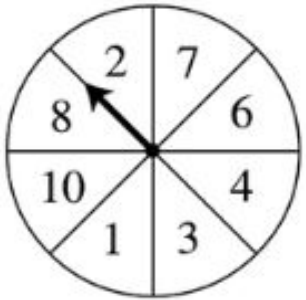
EXAMPLE PROMPTS

To win a game, Tamika must spin an even number on a spinner identical to the one shown below.

Are Tamika's chances of spinning an even number certain, likely, unlikely, or impossible?

[10 points]

A. certain
B. likely
C. unlikely
D. impossible



EXAMPLE PROMPTS: **SOLVE A SIMPLER PROBLEM**

To win a game, Tamika must spin an even number on a spinner identical to the one shown below.

Are Tamika's chances of spinning an even number certain, likely, unlikely, or impossible?

[10 points]

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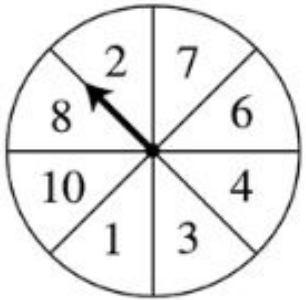


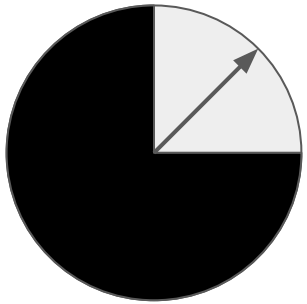
EXAMPLE PROMPTS: **SOLVE A SIMPLER PROBLEM**

To win a game, Tamika must spin a black segment on the spinner below.

Are Tamika's chances of landing on black certain, likely, unlikely, or impossible?

[5 points]

A. certain
B. likely
C. unlikely
D. impossible

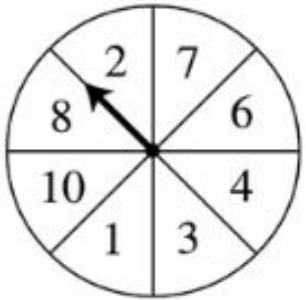


EXAMPLE PROMPTS: **SOLVE A SIMPLER PROBLEM**

To win a game, Tamika must spin an even number on a spinner identical to the one shown below.

Circle the numbers Tamika wants to land on to win.

[2 points]



Talk to Me

TRY YOUR OWN: **SOLVE A SIMPLER PROBLEM**

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Are Tamika's chances of spinning an even number certain, likely, unlikely, or impossible?

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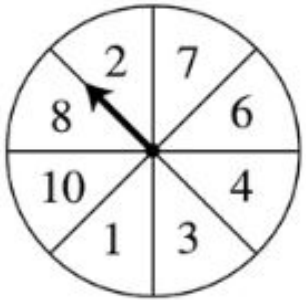
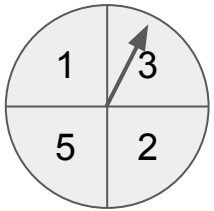


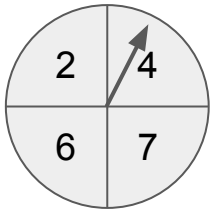
Turn and Talk

EXAMPLE PROMPTS: **SOLVE A SIMPLER PROBLEM**

[1 point] Label any three numbers as “win” or “lose”

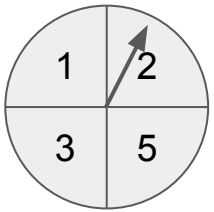
[4 points] Which spinner should Tamika use?





[6 points] Tamika wins if she spins 6 or lower

[8 points] What are Tamika’s chances of winning with this spinner?



TRY YOUR OWN: **EXPLAIN THE PROBLEM**

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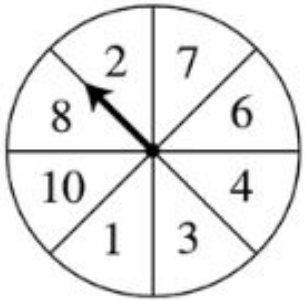

Turn and Talk

EXAMPLE PROMPTS: **EXPLAIN THE PROBLEM**

[1 point] Underline words that you think are important, but you don't know.

[2 points] Circle and explain the important math words you know

[3 points] Explain the problem in your own words

[4 points] Rewrite the problem using dice instead of a spinner

PROMPTS ON OTHER PROBLEMS

Solve for x: 2x+4=10

EXAMPLE PROMPTS: **TEST/RESTRICT POSSIBLE ANSWERS**

Solve for x: 2x+4=10

EXAMPLE PROMPTS: **TEST/RESTRICT POSSIBLE ANSWERS**

Solve for x: $2x+4=10$

[1 point] Try any three possible x values and show if they solve the equation

[3 points] Can x be less than 0? Why or why not?

TRY YOUR OWN: **TEST/RESTRICT POSSIBLE ANSWERS**

Solve for x: $2x+4=10$

[1 point] Try any three possible x values and show if they solve the equation

[3 points] Can x be less than 0? Why or why not?

TRY YOUR OWN: **ANY STRATEGY**

Solve for x: 2x+4=10

[Test/restrict possible answers]: Is it possible for x to be less than 0?
[Solve a simpler problem]: Solve for x: 2x=10
[Explain the problem]: Draw a picture showing this equation

[Find an equivalent problem]: ?
[Work backwards]: ?
[Assume part of an answer and keep going]: ?
[Find a real-world example]: ?

Turn and Talk