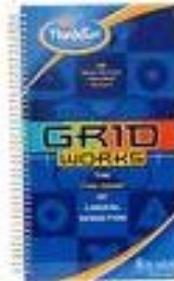


Access to the Game

Lessons of Equity and Engagement from Mathematics Reform

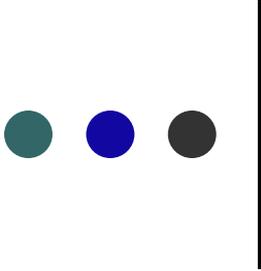


7	4	5						
2		3	7	8				6
				9		5	7	
4		7						
9								3
				3				2
1	5	9						
2		1	4	7		9		
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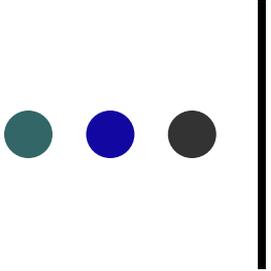
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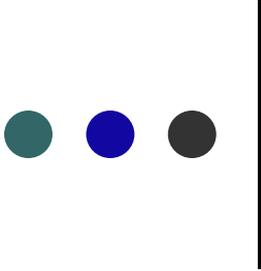
Presentation Agenda

- ❑ Program Overview
- ❑ Mathematics Curriculum
- ❑ Let's Play!
- ❑ Community Engagement & Organizing
- ❑ Discussion and Questions



Balls in the Air

- Why are African American students disengaged in math?



What is MATRIX

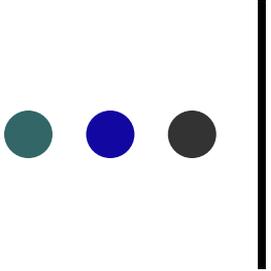
Innovative Two-Part Focus

❑ **Mathematic Curriculum**

- Use of mathematical games as basis for a supplemental accelerated mathematics curriculum

❑ **Community Engagement**

- Long term sustainability of access to high quality math courses through intensive community engagement



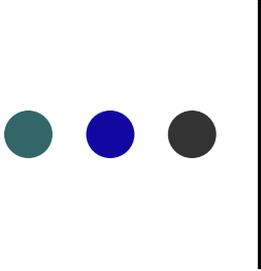
Benefit of Games

Student Benefit

- ❑ Positive effect on student motivation
- ❑ Foster self exploration

Teacher Benefit

- ❑ Learn about students' mathematical thinking
- ❑ Observe students strategic behaviors

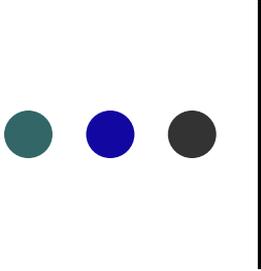


Additional Benefits of Ethnomathematical Games

- ❑ Create space for students of color to see that people of color contributed to the field of mathematics.
- ❑ Games played by different cultures have historically provided insight into how different people enact mathematics.
- ❑ Provide an extremely rich context for mathematical experiences.

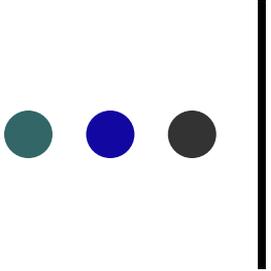
THE CURRICULUM





Goals of Curriculum

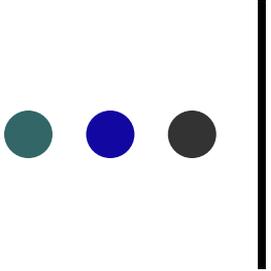
- ❑ **Goal I:** Students will develop strategic approaches to solve game challenges involving logical deduction and number sense.
- ❑ **Goal II:** Students will be able to use taught strategic approaches to solve problems involving logical deduction and number sense.
- ❑ **Goal III:** Students will be able to articulate multiple ways of solving game challenges involving logical deduction and number sense.
- ❑ **Goal IV:** Students will learn to work as an intellectual team.



Curriculum Design

MATRIX mathematics curriculum was designed so that students would

1. Learn progressively difficult mathematical games
2. Be challenged to learn mathematical facts
3. Build their computational, problem solving, and mathematical reasoning skills.



Components of Curriculum

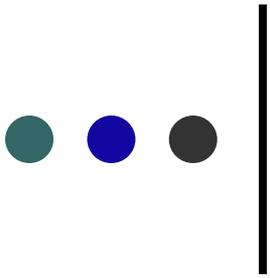
- ❑ Five kinds of exercises and challenges

1. *Oh No! 99!*
2. *Get to a 1,000*
3. *Mancala*
4. *Gridworks*
5. *Sudoku*

- ❑ Diverse ability student teams

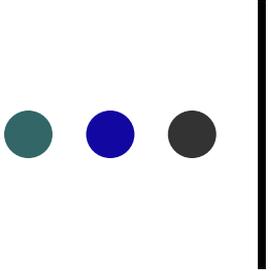
- ❑ Mental Mathematics

- ❑ Incorporation of writing



Students' Voices

- ❑ “It’s fun and educational.”
- ❑ “I learned how to play new games and to learn at the same time.”
- ❑ “I learned how to multiply with 1,10,100.” (*in reference to Get to a 1,000*)
- ❑ “I think this game is fun because it helps you with your place value.” (*in reference to Get to a 1,000*)



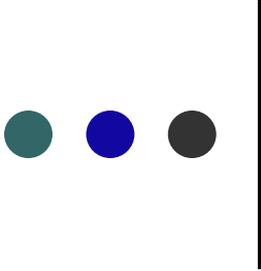
Oh No! 99!

- This game provides students with the opportunity to practice mental addition and subtraction of small numbers. In this two-person game, players attempt to force their opponent to be the one to push their accumulating score over 99.



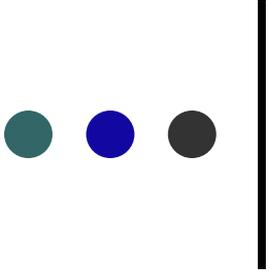
LET'S PLAY-Oh No! 99!





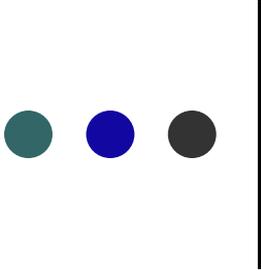
Oh No! 99! Card Values and Operations

- ❑ Aces: add 1
- ❑ Jacks: subtract 10
- ❑ Queens: wild cards that can represent any other card in the deck
- ❑ Kings: add zero
- ❑ All others (2-10): add their face value



Oh No! 99! Free Thinking

- ❑ What is the mathematics is embedded in this game?
- ❑ How can this game support mathematical learning?



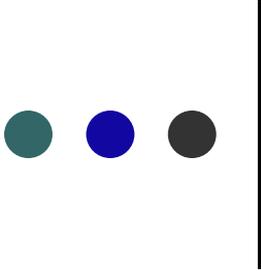
Oh No! 99! Writing Prompts

- ❑ What strategies did you use when playing against your partner?
- ❑ The total score is 85, you have four cards: a six, three, queen, and a two. Which card should you play next and why?

- ● ●

Community Engagement

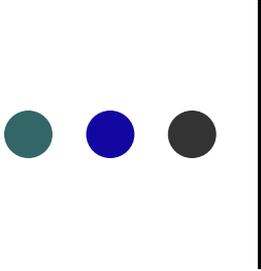




Importance of Access to Rigorous Curriculum

- ❑ Academic intensity (rigor) and quality of one's high school curriculum counts most in preparation for bachelor's degree completion 
- ❑ Math is a significant gatekeeper





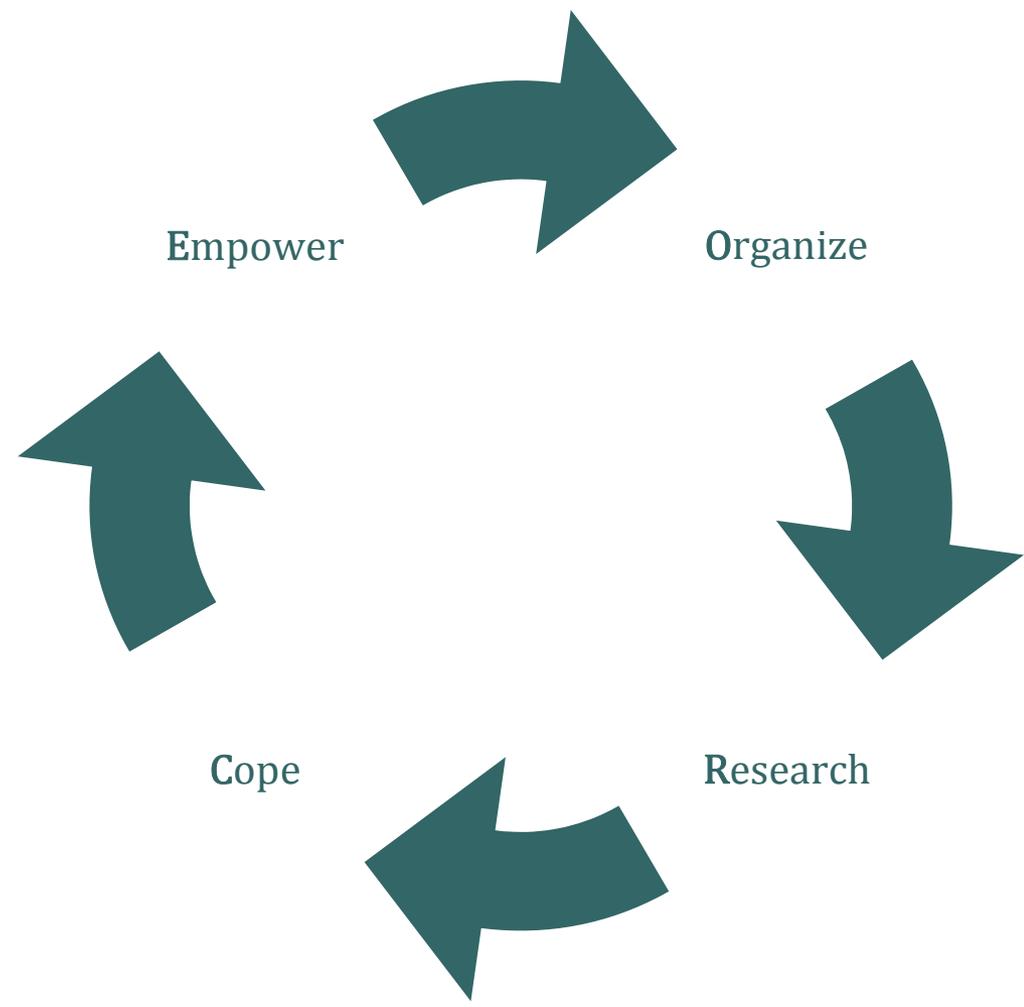
MP Goals for Community Engagement

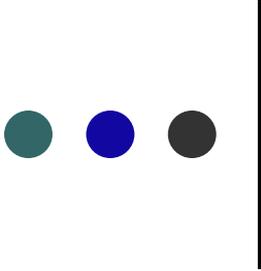
1. Cover basics of education policy
1. Demystify local education policy 
2. Map key decision benchmarks for short and long term student achievement





Community Engagement Model





Small Group Discussion: S.W.O.T. Analysis of MATRIX

Strengths

What are the advantages?

Weaknesses

What are the disadvantages?

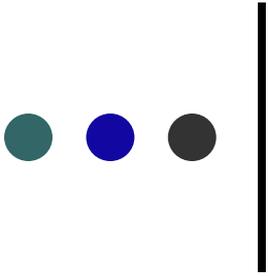
Opportunities

What are opportunities for collaboration and partnership ?

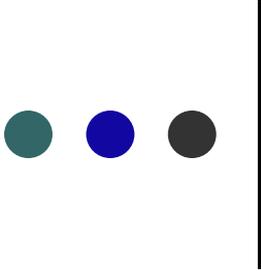
Threats

What factors could cause constraints?





Questions and Discussion



For more information:

Math Curriculum

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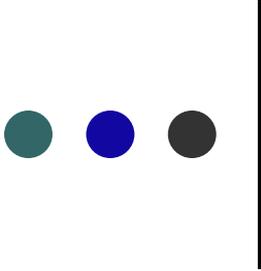
Community Engagement

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- ❑ Malloy, C. & Jones, G.M. (1998). An Investigation of African American students' mathematical problem solving. *Journal of Research in Mathematics Education*, 29, 143-163.
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