ABOUT THE MATH CIRCLES OF CHICAGO

- Soon to be six sites spread across the city
- 450 (to 600) kids, five levels of Circles
- Novel math, Non-Competitive
- Access for All kids in Chicago
BULGARIAN SOLITAIRE: HOW TO PLAY

- Step 1: Take a card from each pile.
- Step 2: Make a new pile from those cards you picked up.
- Step 3: Go back to Step 1.
EXAMPLE

- 7,3
- 6,2,2
- 5,3,1,1
- 4,4,2
- 3,3,3,1
- 4,2,2,2

- 4,3,1,1,1
- 5,3,2
- 4,3,2,1
- 4,3,2,1
- 4,3,2,1
THE INVESTIGATION

• Explore different partitions
• Explore different numbers of cards
• Representations
• Tables, conjectures, proofs
# THE INVESTIGATION

<table>
<thead>
<tr>
<th>N</th>
<th>Fix?</th>
<th>Pattern</th>
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## The Investigation

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<th>N</th>
<th>Fix?</th>
<th>Pattern</th>
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<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>1→1→1→1→…</td>
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<tr>
<td>2</td>
<td>No; 2 cycle</td>
<td>2→1,1→2→1,1→</td>
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<tr>
<td>3</td>
<td>Yes</td>
<td>2,1→2,1→…</td>
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<tr>
<td>4</td>
<td>No; 3 cycle</td>
<td>2,2→2,1,1→3,1→2,2→…</td>
</tr>
<tr>
<td>5</td>
<td>No; 3 cycle</td>
<td>3,2→2,2,1→3,1,1→3,2→…</td>
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MATHEMATICAL CONNECTIONS: REPRESENTATIONS

- Cards
- Lists
- Young tableau
- Conventions & Communication
MATHEMATICAL CONNECTIONS: ITERATION & PATTERNS

• Fixed points, cycles
• $3,2 \rightarrow 2,2,1 \rightarrow 3,1,1 \rightarrow 3,2,\ldots$
• $3,2,1 \rightarrow 3,2,1 \rightarrow$
• Triangular Numbers
MATHEMATICAL CONNECTIONS: PROBLEM SOLVING

• Make a Simpler Problem
• Introduce Appropriate Notation
• Make a Table, Look for a Pattern
• Use Structure
• Generalize; Extend
MATHEMATICAL CONNECTIONS: OLDER STUDENTS

- Digraphs
- Partitions
- Monovariance
PEDAGOGICAL PROS

- Access—Low Floor, Tactile
- Accessible justification
- Agency—Opportunities for conjectures, problem extension
- High Ceiling
- Lesson with many paths
LET’S COLLABORATE!

• MC² has plans for 5 levels of plans that span 2 years
• Focus now is on improvement of these plans
• Interested in access, community, engagement
LET’S COLLABORATE!

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