Learning is not a Spectator Sport

Constructing Meaningful Talk in the Math Classroom
2 player game Directions: Choose one player to use a O, the other will use an X.

Players take turns to select one, two or three pebbles (player choice). After all the pebbles have been selected, the winner is the one with an odd number of pebbles.
### David Douglas School District

**ENROLLMENT AND DEMOGRAPHICS**

<table>
<thead>
<tr>
<th></th>
<th>Grades K - 3</th>
<th>Grades 4 - 5</th>
<th>Grades 6 - 8</th>
<th>Grades 9 - 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Enrollment</td>
<td>3,238</td>
<td>1,696</td>
<td>2,358</td>
<td>3,036</td>
</tr>
<tr>
<td>Regular Attenders</td>
<td>84.2%</td>
<td>86.2%</td>
<td>83.6%</td>
<td>71.3%</td>
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<tr>
<td>Economically Disadvantaged</td>
<td>77%</td>
<td>77%</td>
<td>75%</td>
<td>74%</td>
</tr>
<tr>
<td>Students with Disabilities</td>
<td>11%</td>
<td>11%</td>
<td>13%</td>
<td>11%</td>
</tr>
<tr>
<td>Ever English Learners</td>
<td>39%</td>
<td>43%</td>
<td>47%</td>
<td>48%</td>
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<tr>
<td>Different Languages Spoken</td>
<td>43</td>
<td>41</td>
<td>41</td>
<td>45</td>
</tr>
<tr>
<td>Mobile Students</td>
<td>16.3%</td>
<td>13.8%</td>
<td>15.3%</td>
<td>15.2%</td>
</tr>
</tbody>
</table>
Can you promise that you will win if it is your turn and there are 3 left?

Does it matter whether you already have an even or odd number of pebbles?
Can you promise a win when it is your turn and there are four pebbles?

If you already have an even number? How do you know?

If you already have an odd number? How do you know?
Can you promise a win when it is your turn and...

- Private think time
- Discuss/share thinking
- Be prepared to share w/ group

Case 1: You have an even number right now

Case 2: You have an odd number right now
Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.
East Metro Mathematics Leadership (EaMML) Project

A collaboration aimed to improve mathematics teaching by developing a cadre of preK-12 teacher leaders that consistently use research-informed instructional practices in support of student mathematics learning and take leadership in sharing that professional learning.
Student Achievement Data

Mathematics Smarter Balanced Assessment (SBA)
EaMML-taught (Tx) students experienced **significantly greater** growth (+7.81 points/yr) than comparison students.
EaMML Effect

Among students who did not meet the standards on the SBA in 2015...

EaMML (Treatment) students were nearly twice as likely to meet the standards in subsequent years than comparison students.
HLM Results: Equity Model

The positive EaMML Effect was *consistent* across student demographic subgroups:

- Socioeconomic status (FRL, non-FRL)
- Ethnicity (Hispanic, non-Hispanic)
- Race (White, non-White)
- Gender
Much of the focus of the grant?

Increasing student engagement and discourse
How am I mindful of increasing student engagement and discourse?

It’s all in the Planning!
Partners
Partners
Whole Group
Launch
I found that one hexagon is equal to two trapezoids...

...but I also think one hexagon is equal to six triangles...

...that means one trapezoid is equal to three triangles.
One triangle is half of the trapezoid.

Teacher: What else is half?

One trapezoid is half of the hexagon.

So the halves are not the same, but they are half of the picture.

Teacher: You mean the figure?

Yes, the figure.
Small Group
Explore
Small Group
How can I incorporate or adapt any part of this for my class?
Launch • Explore • Summarize

603: Saturday (9:30 – 10:30)
Strategies to Implement Problem-Based Lessons
Walter E Washington CC, 204 C
Questions?
Doing Math Is ...

Analyzing, Building, Classifying, Designing, Estimating, Formulating, Generalizing, Hypothesizing, Investigating, Justifying, Knowing, Listing, Modeling, Numbering, Organizing, Patterns, Questioning, Representing, Substituting, Testing, Uncovering, Visualizing, Wondering, explaining, asking why, zipping through mental calculations
Launch  • • • Explore  • • • Summarize

Either at a large scale...or mini - scales within each lesson. The launch and explore have lots of intentional discourse, is often teacher directed at some point but not teacher focused, and the summarize is done with an emphasis on the learning target and the teacher takes a leading role in bringing things together.
THANKS!

Comments and Questions?
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amy_mcqueen@ddsd40.org…