Using Inquiry in the Math Classroom to Cultivate Number Sense

Stephanie Niemi and Anita Qonja
Oxford Community Schools
Hopes

- Positive math identity
- Student agency (voice, choice, and ownership)
- Promote thinking and inquiry
- Promoting a community of learning (learning is a social endeavor)
Inquiry in the Math Classroom

Math Talk Moves/Cards

Questioning
A TYPOLOGY of CLASSROOM QUESTIONS

Consider...

- Types of questions
- Planning our questions
- When do we question? Does your pattern of questioning behavior set the bar for your expectations?
- Do questions stimulate thinking or action?

Action research
Share it! Routine

In the morning, some ducks were in the pond. Later in the day, 17 ducks flew away. Now there are 8 ducks in the pond. How many ducks were in the pond in the morning?
Numberless Word Problems

In the morning, some ducks were in the pond. Later in the day, □ ducks flew away. Now there are □ ducks in the pond. How many ducks were in the pond in the morning?
## Math Talk Partnerships

| **M&M Partners:**               | One higher ability and one lower ability, without a great a great distance in ability  
|                                | Both partners need to be able to explain each problem, use dress rehearsal in case one of the partners is called on. |
| **Travel Buddies:**            | Students traveling at similar speeds. Students are partnered with like-abilities.  
|                                | Both partners need to be able to explain each problem, use dress rehearsal in case one of the partners is called on. |
| **Wildcat Partners**           | No reference to math ability but rather students are partnered on basis that they can understand and support the differences of others and who can work well with others.  
|                                | Both partners need to be able to explain each problem, use dress rehearsal in case one of the partners is called on. |
### Making Math Visible: Ways to Grow a Mathematical Inquiry

**Unit:**

**What makes you say that?** Thinking routines could be used as a math talk move.

<table>
<thead>
<tr>
<th>Thinking Routine</th>
<th>What it Helps Us</th>
<th>Where to Use It Within the Unit</th>
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<tbody>
<tr>
<td>See, Think, Wonder</td>
<td>Describe, interpret, &amp; wonder</td>
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<tr>
<td>Zoom-In</td>
<td>Describe, infer, &amp; interpret</td>
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<tr>
<td>Think-Puzzle-Explore</td>
<td>Activate prior knowledge, wonder, &amp; plan</td>
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<tr>
<td>Chalk Talk</td>
<td>Uncover prior knowledge, ideas, &amp; questions</td>
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<tr>
<td>3-2-1 Bridge</td>
<td>Activate prior knowledge, question, &amp; make connections through figurative language</td>
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<tr>
<td>Compass Points</td>
<td>Plan, uncover personal reactions, make decisions</td>
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<tr>
<td>The Explanation Game</td>
<td>Understanding why something is the way it is; build motivations</td>
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<td>I Used to Think, Now I Think</td>
<td>Reflect and use macro cognition</td>
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<tr>
<td>Connect-Extend-Challenge</td>
<td>Make connections, identify new ideas, &amp; raise questions</td>
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<tr>
<td>The 4 C's</td>
<td>Make connections, identify key concepts, raise questions, &amp; consider implications</td>
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<tr>
<td>What makes you say that?</td>
<td>Use reasoning with evidence</td>
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<td>Top of War</td>
<td>Identify &amp; build both sides of an argument or dilemma</td>
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<tr>
<td>Claim-Support-Question</td>
<td>Identify generalizations, reason with evidence, &amp; make counterarguments</td>
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</tbody>
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*Visible Thinking Routine Organizer, Thinking Routines from Visible Thinking, Visible Thinking Research, Church, Morrison (2017)*
Number Talks

Key Components of Number Talks
- Classroom environment and community
- Classroom discussions
- Teacher’s Role
- Role of mental math
- Purposeful problems

Benefits of Sharing and Discussing
- Clarify thinking
- Consider and test other strategies
- Investigate math relationships
- Make decisions about efficient strategies
- Prove thinking with peers
Number Talks

123 - 59

Solve mentally
Be ready to share your thinking and strategies
Word Toss

questioning

inquiry

talking

thinking

environment

roles

community

number sense
Any questions?

stephanie.niemi@oxfordschools.org (@sniemi01)
anita.qonja@oxfordschools.org (@AnitaQonja)
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