Developing Number Sense with Middle School Students

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2:15 p.m. - 3:00 p.m.
Presenters

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What is Number Sense?

- In 2000, the National Council for the Teachers of Mathematics defined number sense as: moving from the initial development of basic counting techniques to more sophisticated understanding of the size of numbers, number relationships, patterns, operations, and place value.
- This means that simply number counting and recognition are no longer enough to meet our student's needs.
Subitizing

The ability to quickly glance at a group of objects and identify how many objects are in the group without counting.
Classroom Structure

- Small groups!!!
- Technology: Mobymax on tablets
- Coding for higher level problem solvers
- Games: Leveled according to ability
- Teacher group: Number talks
- Independent work: Based on levels enrichment activities
Number Talks

○ Start with smaller problems to elicit thinking from multiple perspectives
○ Be prepared to offer a strategy from a previous student
○ It is alright to put a students strategy on the back burner
○ Limit talks to 5-15 minutes
○ Be patient

\[ 12 + 8 = \]

\[
\begin{align*}
12 + 8 &= 20 \\
8 + 2 &= 10 \\
10 + 10 &= 20
\end{align*}
\]

\[ 4 + 2 = 6 \]

\[
\begin{align*}
16 + 4 &= 20 \\
6 + 4 &= 10 \\
10 + 10 &= 20
\end{align*}
\]
Small Group Instruction

- Increases Engagement
- Allows for differentiation
- Teachers are better informed about students' abilities
- Students are more likely to feel comfortable participating
Hands-on Experiences

Depending on student ability these occur within the teacher group structure or independent work structure. Including but not limited to:

- Base 10 blocks
- Fraction circles, tiles, and towers
- Integer chips
- Abacus
Technology

We are fortunate to have dedicated iPads and Kindle Fires to work with our students programming.

Websites/programs we find useful:

- mobymax.com
- code.org
- learnzillion.com
- khanacademy.org
Results

85% of students participating (100% special education population) achieved at least a 1.0 grade level increase in math by January. Students who did not achieve this mark were chronically absent (1-2 days a week).

One student increased his grade equivalent from a 1.2 to a 3.3.
## Results-Small Group Intervention

<table>
<thead>
<tr>
<th>Student</th>
<th>*Pre-Test Results</th>
<th>*Post Test Results</th>
<th>**Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>185</td>
<td>186</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>197</td>
<td>206</td>
<td>9</td>
</tr>
<tr>
<td>C</td>
<td>202</td>
<td>217</td>
<td>15</td>
</tr>
<tr>
<td>D</td>
<td>164</td>
<td>203</td>
<td>39</td>
</tr>
<tr>
<td>E</td>
<td>196</td>
<td>207</td>
<td>11</td>
</tr>
<tr>
<td>F</td>
<td>216</td>
<td>210</td>
<td>-6</td>
</tr>
<tr>
<td>G</td>
<td>179</td>
<td>187</td>
<td>8</td>
</tr>
<tr>
<td>H</td>
<td>207</td>
<td>214</td>
<td>7</td>
</tr>
<tr>
<td>I</td>
<td>183</td>
<td>185</td>
<td>2</td>
</tr>
</tbody>
</table>

*NWEA administered before and after 8 weeks of intervention.

**5 points is considered 1 year growth.
Numeracy Next Steps:

Estimating EVERYTHING (Estimation Jar)
Number of the day
Counting on, skip counting
Master basic math facts
Rich problem solving opportunities
  Develop schedules and timetables
  Review statistical data on news/paper
determine authors purpose
Plan and set priorities
Analyze cell phone and electrical bills and
costs against previous bills
Always try to put numbers into context