

# MATH

## I. Operations & Algebraic Thinking

Operations and algebraic thinking involves word problems, representations, and operations with integers. It moves students beyond simply memorizing facts to thinking beyond the rules and procedures in order to draw logical conclusions by developing an understanding of a situation, context, or concept and connecting it with other knowledge.

A.

### Students may have Difficulty in the Following Areas

- Math vocabulary
- Math phrases (i.e., greater than, less than)
- Finding different approaches to the same math problem
- Keeping information in their working memory
- Organizing things in a logical way

B.

### Assessment Tools

1. Use **Formative Assessment Strategies** that focuses on accuracy, efficiency, flexibility, and appropriate strategy selection:
  - **Interviews** – Students explain what they know about a topic (e.g. How did you figure this out?)
  - **Observations** – Tracking the strategies the students use (e.g. Students tell their peers both the answer to a math fact and how they solved it.)
  - **Journaling** – The students explain what they know about a topic through writing prompts (e.g. If your friend did not know the answer to  $4 + 5$ , how could he figure it out?)
  - **Quizzes** – Questions are used to see if students know foundational facts. (e.g. Solve these problems and tell how you solved them.)
2. **Error Analysis:** Determine whether errors in a student's computation are based on systematic misunderstanding of processes or procedures
3. **Polya Model:** enables the teacher to assess the problem-solving strategies needed to support the student(s) understanding of word problems.

<b>C.</b>	<b>Progress Monitoring Tools</b>
	<ul style="list-style-type: none"> <li>• Mastery Connect</li> <li>• Jordan School District grade level Benchmark Assessments</li> </ul>
<b>D.</b>	<b>Research-Based Interventions</b>
	<p><b><u>Understand the Problem</u></b></p> <ol style="list-style-type: none"> <li>1. Survey, Question, Read (SQR)</li> <li>2. Frayer Vocabulary Model</li> <li>3. Mnemonic Strategies for Problem Solving</li> <li>4. Graphic Organizers: <ul style="list-style-type: none"> <li>Four-Corners-and-a-Diamond</li> <li>Hierarchal Diagramming</li> <li>Sequence Chart</li> <li>Compare and Contrast</li> </ul> </li> <li>5. Interpreting Math Graphics Using Question-Answer Relationships (QARs)</li> </ol> <p><b><u>Create a Plan to Solve the Problem</u></b></p> <ol style="list-style-type: none"> <li>6. Hypothesize &amp; Estimate</li> <li>7. Problem-Solving Strategies: <ul style="list-style-type: none"> <li>Guess and Check</li> <li>Make a Table, List or Chart</li> <li>Look for a Pattern</li> <li>Drawing Diagrams</li> <li>Work Backwards</li> <li>Use Logical Reasoning</li> </ul> </li> <li>8. STAR problem-solving strategy</li> </ol> <p><b><u>Implement a Solution Plan</u></b></p> <ol style="list-style-type: none"> <li>9. Implement Your Solution Plan</li> </ol> <p><b><u>Reflect on the Problem</u></b></p> <ol style="list-style-type: none"> <li>10. Reflection on the Problem-Solving Process</li> <li>11. Reflection Through Math Journal Writing</li> </ol>

<b>E.</b>	<b>Research Based Teaching Strategies</b>
	<ol style="list-style-type: none"> <li>1. Linking CRA: Concrete, Representational, Abstract</li> <li>1. Fluency: Have Students Write Every Day</li> <li>2. Fluency: Self-Monitor and Graph Results</li> </ol>
<b>F.</b>	<b>Additional Intervention Materials</b>
	<ol style="list-style-type: none"> <li>1. Interventional Central: <a href="http://www.interventioncentral.org/">http://www.interventioncentral.org/</a></li> </ol>
<b>G.</b>	<b>Readings and Reference Materials</b>
	<ul style="list-style-type: none"> <li>• Required Fluencies in K-6</li> <li>• Jordan School District Elementary Math website: <a href="http://elemmath.jordandistrict.org/">http://elemmath.jordandistrict.org/</a></li> <li>• Jordan School District Secondary Math website: <a href="http://secondarymath.jordandistrict.org/">http://secondarymath.jordandistrict.org/</a></li> </ul>
<b>H.</b>	<b>EL Resources</b>
	<p><b>PD Bites - A Buffet of Learning (WIDA, SIOP, Engagement, Culturally Responsive Teaching)</b></p> <p>"On Demand" Professional Development Modules designed to help you help all of your students, including your culturally and linguistically diverse students, find academic success in your classroom.</p> <p>These modules are located in Canvas and can be accessed by following the links below.</p> <p>Modules can be completed at your own pace and on your own time.</p> <p>Topics include: WIDA, SIOP, Academic Language, Culturally Responsive Teaching, Engagement, etc.</p> <p><i>To get started click on the appropriate link below:</i></p> <ul style="list-style-type: none"> <li>• <i>Already have a JordanPD Canvas account?</i> Click here to enroll: <a href="#">PD Bites on Canvas</a></li> <li>• <i>Need to create a JordanPD Canvas account?</i> <a href="#">Request an invitation</a> - Put "PD Bites" in the subject line. (Once you receive the invitation, you will need to create an account.)</li> </ul>