Standards for Mathematical Practice Reference Sheet

|  |  |  |
| --- | --- | --- |
| **Metacognitive Prompts Math Practice 1** | | |
| **Before** | **During** | **After** |
| • What is the problem asking?  • What information is needed to solve the problem?  • What information do I know?  • Does this problem remind me of any problems I have solved in the past? If so, what did I do?  • How can I organize this information?  • Do I need to add, subtract, multiply, or divide? Why? | • Is the strategy working?  • Do I need to try another approach?  • Does the answer make sense?  • Explain | • Why did I solve the problem that way?  • What was easy/hard about solving this problem?  • If I got stuck, what did I do to get unstuck?  • Is there another way to solve this problem? |
| **Teacher Reflection Questions**  • Do I demonstrate that I value the process rather than simple the correct answer?  • Do I give problems that require perseverance and use questioning to guide and support my students as the problem solve?  • Do I provide students the opportunity to share their work and solutions with a partner, group or the whole class? | | |

|  |
| --- |
| **How Can Math Practice 2 Be Reinforced in The Classroom?** |
| • Number webs (how many ways can you show 12?) builds flexibility for decontextualizing.  • Writing a word problem (e.g. for 3 x 4) builds contextual fluency.  • Create a word problem that allows students to represent it abstractly and then requires them to us the answer for an appropriate response.  • Encourage students to write about how math plays a role in their own life. |
| **Teacher Reflection Questions**  • How do I deepen my students’ understanding of numbers (flexibility) to better understand quantities?  • Am I allowing my students to create their own problems with a real world context?  • Am I challenging my students to make sense of their answers by recontextualizing? |

|  |
| --- |
| **How Can Math Practice 3 Be Reinforced in The Classroom?** |
| • Using an Eliminate Strategy  • Agree or Disagree (Teacher poses a math statement. Students either agree or disagree. Students must include math reasoning to support their argument.)  • Find the Mistake (Students critique faulty work and offer ideas as to why it’s incorrect.) |
| **Teacher Reflection Questions**  • Do I give my students an opportunity to listen to others and assess their arguments?  • Do my students back up their arguments with appropriate math reasoning?  • Do I provide opportunities for my students to assess faulty work? |

|  |  |
| --- | --- |
| **How Can Math Practice 4 Be Reinforced in The Classroom?** | |
| **Representations** | • Part-Whole Modeling for addition and subtraction  • Bar Diagrams |
| **Metacognitive Prompts** | • Tell me what your model represents.  • Why did you choose to represent it this way?  • How did creating this model help you?  • Is there another way you might have modeled this problem? How? |
| **Teacher Reflection Questions**  • Do I encourage my students to create diagrams to solve problems?  • Do I ask my students why they chose a particular model?  • Do I encourage my students to revise a model if needed?  • Do I have my students write about what they learned from their model? | |

|  |  |
| --- | --- |
| **Considerations for Math Practice 5** | |
| **Students Ask Themselves** | • Am I using the best tool available to help me analyze the problem?  • Is there a better tool I could use to help solve the problem?  • Do I understand why this tool was helpful?  • Can I explain the process to somebody else using this tool?  • Do my results make sense? |
| **Teacher Should Consider** | • Choose the tool(s) to support the lesson’s objectives.  • Introduce new tools to students.  • Consider the students when planning the lesson.  • Communication about the use of the tools is the key to the effectiveness of using tools. Ask appropriate questions frequently.  ~ What do the blocks represent?  ~ What number did you start with?  ~ Explain how you decided upon the groupings.  ~ How did you know that three groups of five is 15?  • Connect your students’ thinking to the strategies. The ultimate goal is to move students from concrete to pictorial to abstract. This supports the development of mathematically proficient students. |

|  |  |
| --- | --- |
| **How Can Math Practice 6 Be Reinforced in The Classroom?** | |
| **Categorize** | • Identify similarities and differences between math concepts.  Sort the following math terms and explain how they are sorted.  • sum, minus, join, subtract, add, take apart, plus  • square, trapezoid, hexagon, rectangle, rhombus, triangle, pentagon  • pint, foot, measuring cup, ounce, inch, scale, yard, pound, quart, ruler |
|  | |
| **Teacher Reflection Questions**  • Do I discuss important math vocabulary and explore word meanings through familiar language, words, pictures, and examples?  • Do I ask students to label units, quantities, and graphs?  • Do I provide opportunities for students to work with partners to formulate explanations?  • Do I expect accuracy unless an estimate is desired? | |

|  |  |
| --- | --- |
| **How Can Math Practice 7 Be Reinforced in The Classroom?** | |
| **Look for patterns in:** | • Hundreds and Multiplication Charts  • Math Properties  • Fraction and Decimal Equivalents  • Fact Families |
| **Teacher Reflection Questions**  • Do I ask my students what they notice and wonder?  • Do I give my students opportunities to look for patterns while problem solving?  • Do I model the use of properties in solving problems?  • Do I provide opportunities for my students to discuss and prove math properties? | |

|  |
| --- |
| **How Can Math Practice 8 Be Reinforced in The Classroom?** |
| • Provide problems that provide opportunities for students to discover patterns through data collection or making a table.  • Provide combination problems: ~ Bill has 5 shirts and 3 pairs of pants. How many outfits can he make? |
| **Teacher Reflection Questions**  • Do I ask students to look for repetition of patterns?  • Do I provide problems that require the collection of data?  • Do I have students look for short-cuts when solving problems?  • Do I encourage risk taking? |