**Questioning for Evidence of the**

**Standards for Mathematical Practice**

**SMPs 1 & 6**

**Problem Solving and Precision**

This document can be used for teacher moves to support the instruction of the standards for mathematical practice. It can also be used when observing students to see their trajectory towards proficiency.

|  |  |  |
| --- | --- | --- |
| **Standard for Mathematical Practice** | **California Framework Examples** | **Questions to Develop Mathematical Thinking** |
| **SMP 1 Make sense of problems and persevere in solving them.**  **Mathematically proficient students:**   * Understand the meaning of the problem and look for entry points to its solution. * Analyze information. * Make conjectures and plan a solution pathway. * Monitor and evaluate the progress and change course as necessary. * Use concrete objects or picture to help solve a problem. * Check answers to problems and ask, “Does this make sense?” | Students explain to themselves the meaning of a problem and look for ways to solve it. Younger children may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking, “Does this make sense?” They are willing to try other approaches. They make conjectures about a problem and plan out a problem-solving approach. Students listen to other students’ strategies and are able to make connections between various methods for a given problem. In upper grades, students might use an equation to solve a problem. They may use visual models. They use another method to check their work. They look for efficient ways to represent and solve a problem. | * How would you describe the problem in your own words? * How would you describe what you are trying to find? * What do you notice about \_\_\_\_\_? * What information is given in the problem? * Describe the relationship between quantities. * Describe what you have already tried. What might you change? * Talk me through the steps you used to this point. * What steps in the process are you most confident about? * What are some other strategies you might try? * What are some problems that are similar to this one? |
| **Standard for Mathematical Practice** | **California Framework Examples** | **Questions to Develop Mathematical Thinking** |
| **SMP 6 Attend to precision.**  **Mathematically proficient students:**   * Communicate precisely with mathematical vocabulary. * State the meaning of symbols, specifying units of measure, providing accurate labels. * Calculate accurately and efficiently. * Provide careful explanations. * Label accurately when measuring and graphing. | Students begin to develop precise communication skills, calculations and measurements. Students describe their own actions, strategies and reasoning using grade-level-appropriate vocabulary. During tasks involving number sense, students check their work to ensure the accuracy and reasonableness of solutions. Students are encouraged to answer questions, such as, “How do you know your answer is reasonable?” When students measure, they are careful not to have gaps or overlaps. Upper grade students are careful to specify units of measure and to state the meaning of symbols they use. For example, in calculating area, they use square units. In calculating the volume of a shape, students record their answer in cubic units. | * What mathematical terms apply in this situation? * How did you know your solution was reasonable? * Explain how you might show that your solution answers the problem. * What might be a more efficient strategy? * How are you showing the meaning of quantities? * What symbols or mathematical notations are important in this problem? * What mathematical language, definitions, properties (and so forth) can you use to explain\_\_\_\_? * How can you say it in a different way? * Can you say it in your own words? Now say it in mathematical words. * How can you test your solution to see if it answers the problem? |