**Questioning for Evidence of the**

**Standards for Mathematical Practice**

**SMPs 4 & 5**

**Modeling and Using Tools**

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.

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| **Standard for Mathematical Practice** | **California Framework Examples** | **Questions to Develop Mathematical Thinking** |
| **SMP 4 Model with mathematics.**  **Mathematically proficient students:**   * Apply prior knowledge to solve real world problems, for example, write an equation to describe a situation. * Identify important quantities and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and/or formulas. * Use assumptions and approximations to make a problem simpler. * Check to see if an answer makes sense within the context of a situation and change a model when necessary. | In early grades, students begin to represent problem situations in multiple way – by using numbers, objects, words, or mathematical language, acting out the situation, making a chart or list, drawing pictures, creating equations, and so forth. Students rely on manipulatives (or other visual and concreate representations) while solving tasks and record and answer with a drawing or equation. Students need opportunities to connect the different representations and explain the connections. They should be able to use any of these representations as needed. Students model real-life mathematical situations with an equation and check to make sure that their equation accurately matches the problem context. | * What math drawing or diagram could you make and label to represent the problem? * What are some ways to represent the quantities? * What is an equation or expression that matches the (diagram, number line, chart, table, etc.)? * What are some ways to visually represent \_\_\_\_\_? * What formula might apply in this situation? |
| **Standard for Mathematical Practice** | **California Framework Examples** | **Questions to Develop Mathematical Thinking** |
| **SMP 5 Use appropriate tools strategically.**  **Mathematically proficient students:**   * Make sound decisions about the use of specific tools. * Use technological tools to explore and deepen the understanding of concepts. * Identify relevant external math resources, for example: digital content online. | Younger students begin to consider tools available to them when solving a mathematical problem and decide when certain tools would be helpful. Students decide which tools, such as counters, place-value (base ten) blocks, hundreds number boards, concrete geometric shapes, and virtual representations, may be helpful to use depending on the problem or task and explain why they use particular mathematical tools.  Students understand which tools are the most appropriate to use, for example, when measuring a hallway, students are able to explain why a yardstick is more appropriate to use than a ruler. They may choose to use graph paper to find all the possible rectangles with a given perimeter. They use other measurement tools, including estimation, to understand the relative size of units within a system and express larger units in terms of smaller units. | * What mathematical tools could we use to visualize and represent the situation? * What information do you have? * What do you know that is not stated in the problem? * What approach would ou consider trying first? * What estimate did you make for the solution? * In this situation, would it be helpful to use a (graph, number line, ruler, diagram, calculator, manipulatives, etc.)? * Why was it helpful to use \_\_\_\_\_? * What can using a \_\_\_\_\_\_ show us that \_\_\_\_\_\_\_may not? * In what situations might it be more informative or helpful to use \_\_\_\_\_? |