**Questioning for Evidence of the**

**Standards for Mathematical Practice**

**SMPs 7 & 8**

**Seeing Structure and Generalizing**

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 7 Look for and make use of structure.****Mathematically proficient students:*** Look closely to discern a pattern or structure.
* Use structures such as place value, the properties of operations, and attributes of shapes to solve problems.
* Step back for an overview and shift perspective.
* Can see complicated things as single objects or as being composed of several objects.
 | Younger students begin to discern a pattern or structure in the number system. Students use counting strategies, such as counting on, counting all, or taking away, to build fluency. Students look for patterns and structures in other areas of mathematics, beginning to recognize the commutative and distributive properties. Students use properties of operations to explain calculations (partial product model). Students see structure in the base-ten system. Students adopt mental math strategies based on patterns. They generate number or shape patterns that follow a given rule.  | * What observations can you make about \_\_\_\_?
* What do you notice when \_\_\_\_\_?
* What parts of the problem might you (eliminate, simplify, etc.)?
* What patterns do you find in \_\_\_\_?
* How do you know if something is a pattern?
* What ideas that we have learned before were useful in solving this problem?
* What are some other problems that are similar to this one?
* How does this relate to \_\_\_\_\_?
* In what ways does this problem connect to other mathematical concepts?
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| **Standard for Mathematical Practice** | **California Framework Examples** | **Questions to Develop Mathematical Thinking** |
| **SMP 8 Look for and express regularity in repeated reasoning.****Mathematically proficient students:*** Notice if calculations are repeated, and look for both general methods and for shortcuts.
* As they work to solve a problem, maintain oversight of the process, while attending to the details.
* Continually evaluate the reasonableness of their intermediate results.
 | In the early grades, students notice repetitive actions in counting, computations, and mathematical tasks. Students add by using strategies such as “make a ten” or doubles. Students recognize when and how to use strategies to solve similar problems. Students continually check for the reasonableness of their solutions during and after completion of a task by asking themselves, “Does this make sense?” Upper grade students notice repetitive actions in computations and look for “shortcut” methods. Students use models to explain calculations and understand how algorithms work. They generate their own algorithms. Students connect place value and their prior work with operations to understand and use algorithms to extend multi-digit division from one-digit to two-digit divisors and to fluently multiply multi-digit whole numbers. They use strategies to perform all operations with decimals to hundredths, and they explore operations with fractions and begin to formulate generalizations. | * Explain how this strategy works in other situations.
* Is this always true, sometimes true, or never true?
* How would we prove that \_\_\_\_\_\_?
* What do you notice abut \_\_\_\_\_\_\_?
* What is happening in this situation?
* What would happen if \_\_\_\_\_\_?
* Is there a mathematical rule for \_\_\_\_?
* What predictions or generalizations can this pattern support?
* What mathematical consistencies do you notice?
* How is this situation like and different from other situations using this operation?
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