

Table OV-3	
Summary of the Standards for Mathematical Practice	Questions to Develop Mathematical Thinking
<p>MP.1 Make sense of problems and persevere in solving them.</p> <ul style="list-style-type: none"> Mathematically proficient students interpret and make meaning of the problem to find a starting point. Analyze what is given in order to explain to themselves the meaning of the problem. Plan a solution pathway instead of jumping to a solution. Monitor their own progress and change the approach if necessary. See relationships between various representations. Relate current situations to concepts or skills previously learned and connect mathematical ideas to one another. Continually ask themselves, “Does this make sense?” Can understand various approaches to solutions. 	<ul style="list-style-type: none"> How would you describe the problems 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 the quantities. Describe what you have already tried. What might you change? Talk me through the steps you have 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 other problems that are similar to this one? How might you use one of your previous problems to help you begin? How else might you [organize, represent, show, etc.] _____?

Table OV-3 (continued)	
Summary of the Standards for Mathematical Practice	Questions to Develop Mathematical Thinking
<p>MP.2 Reason abstractly and quantitatively.</p> <ul style="list-style-type: none"> Mathematically proficient students make sense of quantities, and the relationships between quantities, in problem situations. Decontextualize (represent a situation symbolically and manipulate the symbols) and contextualize (make meaning of the symbols in a problem) quantitative relationships. Understand the meaning of quantities and flexibly use operations and their properties. Create a logical representation of the problem. Attend to the meaning of quantities, not just how to compute them. 	<ul style="list-style-type: none"> What do the numbers used in the problem represent? What is the relationship of the quantities? How is _____ related to _____? What is the relationship between _____ and _____? What does _____ mean to you? (e.g. symbol, quantity, diagram) What properties might we use to find a solution? How did you decide that you needed to use _____ in this task? Could we have used another operation or property to solve this task? Why or why not?

<p>MP.3 Construct viable arguments and critique the reasoning of others.</p> <ul style="list-style-type: none"> Mathematically proficient students analyze problems and use stated mathematical assumptions, definitions, and established results in constructing arguments. Justify conclusions with mathematical ideas. Listen to the arguments of others, and ask useful questions to determine if an argument makes sense. Ask clarifying questions or suggest ideas to improve or revise the argument. Compare two arguments and determine if the logic is correct or flawed. 	<ul style="list-style-type: none"> What mathematical evidence would support your solution? How can we be sure that _____? How could you prove that _____? Will it still work if _____? What were you considering when _____? How did you decide to try that strategy? How did you test whether your approach worked? How did you decide what the problem was asking you to find? (What was unknown?) Did you try a method that did not work? Why didn't it work? Would it ever work? Why or why not? What is the same and what is different about _____? How could you demonstrate a counter-example? I think it might be clearer if you said _____. Is that what you meant? Is your method like Shawna's method? If not, how is your method different?
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table OV-3 (continued)	
Summary of the Standards for Mathematical Practice	Questions to Develop Mathematical Thinking
<p>MP.4 Model with mathematics.</p> <ul style="list-style-type: none"> Mathematically proficient students understand this is a way to reason quantitatively and abstractly (able to decontextualize and contextualize). Apply the mathematics they know to solve everyday problems. Simplify a complex problem and identify important quantities to look at relationships. Represent mathematics to describe a situation either with an equation or a diagram, and interpret the results of a mathematical situation. Reflect on whether the results make sense, possibly improving or revising the model. Ask themselves, "How can I represent this mathematically?" 	<ul style="list-style-type: none"> 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.]? Where did you see one of the quantities in the task in your equation or expression? How would it help to create a [diagram, graph, table, etc.]? What are some ways to visually represent _____? What formula might apply in this situation?

<p>MP.5 Use appropriate tools strategically.</p> <ul style="list-style-type: none"> • Mathematically proficient students use available tools including visual models, recognizing the strengths and limitations of each. • Use estimation and other mathematical knowledge to detect possible errors. • Identify relevant external mathematical resources to pose and solve problems. • Use technological tools to deepen their understanding of mathematics. 	<ul style="list-style-type: none"> • 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 you 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 _____?
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table OV-3 (continued)	
Summary of the Standards for Mathematical Practice	Questions to Develop Mathematical Thinking
<p>MP.6 Attend to precision.</p> <ul style="list-style-type: none"> • Mathematically proficient students communicate precisely with others and try to use clear mathematical language when discussing their reasoning. • Understand the meanings of symbols used in mathematics and can label quantities appropriately. • Express numerical answers with a degree of precision appropriate for the problem context. • Calculate efficiently and accurately. 	<ul style="list-style-type: none"> • 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 would be a more efficient strategy? • How are you showing the meaning of the quantities? • What symbols or mathematical notations are important in this problem? • What mathematical language, definitions, properties (and so forth) can you use to explain _____? • Can you say it in a different way? • Can you say it in your own words? And now say it in mathematical words. • How could you test your solution to see if it answers the problem?

<p>MP.7 Look for and make use of structure.</p> <ul style="list-style-type: none"> Mathematically proficient students look for the overall structures and patterns in mathematics and think about how to describe these in words, mathematical symbols, or visual models. See complicated things as single objects or as being composed of several objects. Compose and decompose conceptually. Apply general mathematical patterns, rules, or procedures to specific situations. 	<ul style="list-style-type: none"> 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?
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table OV-3 *(continued)*

Summary of the Standards for Mathematical Practice	Questions to Develop Mathematical Thinking
<p>MP.8 Look for and express regularity in repeated reasoning.</p> <ul style="list-style-type: none"> Mathematically proficient students see repeated calculations and look for generalizations and shortcuts. See the overall process of the problem and still attend to the details in the problem-solving steps. Understand the broader application of patterns and see the structure in similar situations. Continually evaluate the reasonableness of their intermediate results. 	<ul style="list-style-type: none"> 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 about _____? 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?