Grade 4 • Curriculum Correlation

Grade 4 2020 Ontario Curriculum and Grades K–3 and Grades 4–8 • Open Questions for the Three-Part Lesson

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Grades 4–8 • Open Questions for the Three-Part Lesson: Number Sense and Numeration

Grade 4: 2020 Ontario Curriculum Expectations	Open Questions for the Three-Part Lesson: *Number Sense and Numeration*	G4–8 Book & Page Number
B. NUMBER		
B1. Number Sense **Overall Expectation:** By the end of Grade 4, students will demonstrate an understanding of numbers and make connections to the way numbers are used in everyday life		
Whole Numbers		
B1.1 read, represent, compose, and decompose whole numbers up to and including 10 000, using appropriate tools and strategies, and describe various ways they are used in everyday life	**Q:** You represent a number using base ten blocks with twice as many thousand blocks as ten blocks. What might the number be?	Number • Page 10
	Q: Tell as many mathematical ideas as you can about the number 3__ __ 2.	
	Q: Create a four-digit number with two digits that are 7s and two digits that are 3s. But make sure that one of the 7s is 10 times greater than the other 7 and one of the 3s is 10 times greater than the other 3.	
	Q: You see the number 4102 on an Internet news site. What might that number describe?	
	Q: When you read a number, you say the word thousand but not the word hundred. (For example, one number it could be is three thousand twenty-two; one number it could not be is four hundred twenty.) List several numbers it could be and several numbers it could not be.	
	Q: List three numbers that you can represent with 28 base ten blocks. Describe another way you could represent each number using base ten blocks.	Number • Page 11
	Q: Write five or more four-digit numbers. Each number should have at least one zero. Then, write the numbers in expanded notation.	
	Q: You read a whole number and you say exactly five words. What could the number be?	

B1.1 (continued)	**Q:** When and why might it be useful to use expanded notation to describe a number (e.g., 1204 as 1000 + 200 + 4 or one thousand + two hundred + four ones)?	Number • Page 12
	Q: Do you think there are more ways to represent the number 3005 or the number 3006? Why do you think that?	
	Q: What do you know for sure about a number if you say the word thousand but not the word hundred when you read it?	
	Q: You read two numbers that are written in words. Everything is exactly the same when you read them except for one word. What could the numbers be? How are their standard forms alike? How are they different? Think of three or more examples.	
	Q: A small town has almost 5000 people living in it. A new family moves in. How many people do you think might be in the town now? Explain your answer.	Number • Page 16
	Q: You would eat 10 000 apples in about 27 years if you ate one apple a day. What could you say is true about 10 000 of something else? It could be 10 000 steps, 10 000 people, or 10 000 blades of grass. Think of four or more examples.	Number • Page 17
	Q: How long would it take for at least two of these to happen? • brushing your teeth 10 000 times ... Explain how you figured out your answers.	
	Q: The number 3000 is the answer to a real-life problem that needs to be solved in more than one step. Describe problems where 3000 might be an answer that makes sense.	Number • Page 18
	Q: You use three words to write out a four-digit number on a cheque. List four or more numbers you could be writing. Then, write the numbers out in words. What do you notice about the numbers that you wrote?	Number • Page 63
	Q: You read two numbers greater than 1000 that are written in words. Everything is exactly the same when you read them except for two words. What could the numbers be? How are their standard forms alike? How are their standard forms different?	Number • Page 64

B1.2 compare and order whole numbers up to and including 10 000, in various contexts	**Q:** How is it possible for a number with lots of 7s in it to be less than a number with lots of 3s in it? Explain.	Number • Page 12
	Q: What is the lowest number and what is the greatest number you would be comfortable estimating as 800? Why did you pick these numbers? When might you really use an estimate like that?	
	Q: The numbers 32 and 41 are not that much closer together than 1 49 and 385. What might the missing digits be? Explain.	
	Q: For which numbers might these situations arise? Think of at least three possibilities for each...	Number • Page 14
	Q: Choose four digits between 0 and 9. Create as many four-digit numbers as you can using only these digits. Then, order the numbers from least to greatest.	
	Q: Use the digits 0 to 9 to fill in the blanks. Use each digit only once. Order the numbers from least to greatest. Try it three or more different ways.	
	Q: What numbers might be at the marked points? Justify your choices.	Number • Page 15
	Q: A number that contains the digits 2 and 5 is greater than a number with the digits 7, 8, and 9. How is that possible?	
	Q: You use base ten blocks to represent two numbers. Can it take fewer blocks to represent the greater number? Explain your thinking about whether, when, and why it can or cannot happen.	
	Q: The number of people at one hockey game was 1438 more than the number at another hockey game. How many people might have been at each game? Do you think they were NHL games?	Number • Page 16

B1.3 round whole numbers to the nearest ten, hundred, or thousand, in various contexts	**Q:** Describe a situation where rounding a number makes sense. Describe a situation where it does not make sense.	Number • Page 15
	Q: Describe a situation where it makes more sense to round to the nearest hundred than to the nearest ten. Explain why your situation makes sense.	

Fractions and Decimals		
B1.4 represent fractions from halves to tenths using drawings, tools, and standard fractional notation, and explain the meanings of the denominator and the numerator	**Q:** What makes a fraction a fraction? Is the number 1 a fraction?	Number • Page 20
	Q: Why might someone say that the blue pattern block is ⅓, but someone else might say the blue pattern block is a different fraction?	
	Q: What are some different ways you could divide this shape into fourths? What makes them fourths?	Number • Page 21
	Q: What fractions do you see in this picture?	
	Q: Design a piece of art that is X blue, X yellow, and uses at least two other colours. Tell what fractions the other colours are and how you know. Repeat several different ways.	
	Q: Choose a fraction other than X, X, or X. Create three or more representations of that fraction; at least two of the representations should be a lot alike. Tell why they are alike. Why are the other representations different from these two?	
	Q: Model three different fractions with a numerator of 2. What is the same about all of them? What is different?	Number • Page 22
	Q: Show that the same amount might be X of one thing but X of another thing.	

B1.5 use drawings and models to represent, compare, and order fractions representing the individual portions that result from two different fair-share scenarios involving any combination of 2, 3, 4, 5, 6, 8, and 10 sharers	There are no Open Questions that meet this 2020 curriculum expectation.	
B1.6 count to 10 by halves, thirds, fourths, fifths, sixths, eighths, and tenths, with and without the use of tools	**Q:** Do you think that counting by halves is more like counting by ones or more like skip counting? Why do you think that?	Number • Page 20
	Q: How is counting by fourths like counting by tenths? How is it different?	Number • Page 22
	Q: Will it take a long time to count to 4 by tenths? Explain.	Number • Page 27
B1.7 read, represent, compare, and order decimal tenths, in various contexts	**Q:** Pencils come in packs of ten. You have .1 packs of pencils. How many pencils might you have? How many would you not have? Explain.	Number • Page 27
	Q: X and X are close together. What could go in the blanks? Explain.	
	Q: Create a decimal number that has two 7s where one of the 7s is worth 10 times as much as the other.	
	Q: What values would you give to the dots on this number line? Why?	Number • Page 28
	Q: Put the digits 0 to 9 in the blanks so that the numbers are in order from least to greatest. Use each digit only once. Think of three or more possibilities. How do you know they are ordered correctly?	
	Q: Grab a handful of buttons. Organize them into as many groups of 10 as possible even if there are buttons left over. Record the number of buttons you have in terms of how many groups of 10 and how many there are left over. Remember that leftover buttons are tenths of groups and should be included as part of the number. Repeat several times.	
	Q: Why does it make sense that the place to the right of the ones is called tenths?	Number • Page 29
	Q: Which is greater: X or X? Does it depend on what is in the blanks? Explain.	
	Q: Choose a number of the form X . How can it be written as tenths?	
B1.8 round decimal numbers to the nearest whole number, in various contexts	There are no Grade 4 Open Questions that meet this 2020 curriculum expectation.	

B1.9 describe relationships and show equivalences among fractions and decimal tenths, in various contexts	**Q:** A fraction and a decimal are quite close together on a number line. What might the two numbers be?	Number • Page 27
	Q: Which fractions can be written as decimals?	Number • Page 29
	Q: Choose three fractions you can show as decimal tenths. Use a diagram to show how the decimals and fractions are equal. Choose three fractions that you cannot show as decimal tenths.	

B2. Operations **Overall Expectation:** By the end of Grade 4, students will: use knowledge of numbers and operations to solve mathematical problems encountered in everyday life		
Properties and Relationships		
B2.1 use the properties of operations, and the relationships between addition, subtraction, multiplication, and division, to solve problems involving whole numbers, including those requiring more than one operation, and check calculations	**Q:** When you subtract a four-digit number from another four-digit number, how many digits might be in the answer? If there is more than one possibility, explain when each would occur.	Number • Page 37
	Q: Can you always use addition to solve a subtraction problem? Why or why not?	
	Q: Would you subtract 4000 − 1459 the same way you would subtract 4684 − 1131? Explain why or why not.	
	Q: How is subtracting decimals like subtracting whole numbers? How is it different?	Number • Page 40
	Q: Andrew said that 4.2 − 2 = 4.0. He showed the following calculation: ...	
	Q: How could knowing that 2.1 − 0.8 = 1.3 help you solve other decimal subtraction questions?	
	Q: Why might some people say this picture shows multiplication and some say it doesn't show multiplication?	Number • Page 46
	Q: Draw a picture that explains why 4 × 6 = double 2 × 6.	
	Q: Draw two pictures to show that you can multiply two numbers in either order. Explain how the pictures show this.	
	Q: Choose a two-digit number. Multiply the number by 10. Then, multiply the first number by 8. Subtract the second product from the first product. Repeat for four other two-digit numbers. What do you notice? Why did that happen?	
	Q: What might be an efficient way to figure out 9 × 48?	Number • Page 47
	Q: When might it be useful to realize that division is the opposite of multiplication?	
	Q: What strategies can you use to figure out 7 times a number without actually multiplying by 7?	

B2.1 (continued)	**Q:** Does knowing multiplication facts mean you automatically know division facts? Explain.	Number • Page 48
	Q: Why do you think some people say multiplication is a shortcut to addition?	
	Q: Do you think division is more like multiplication, more like subtraction, or more like addition? Why?	
	Q: When do you think it might be more useful to think of 20 as two 10s instead of as 5 more than 15? When do you think it might be more useful to think of 20 as 5 more than 15?	Number • Page 51
	Q: Do you think that there are other numbers you could multiply to give the same answer as X? Explain.	Number • Page 52
	Q: Why is it just as easy to multiply a number by 20 as it is to multiply that number by 2?	Number • Page 54
	Q: How would you break up 39 to multiply it by 4? Explain why.	
	Q: Would you use the same strategies or different strategies to multiply you would use to multiply X as 48 X? Explain.	
	Q: Choose a division that you think would be easy to do a couple of different ways. Explain your thinking.	Number • Page 57
	Q: How could you figure out how to share 72 objects among four people more easily than dividing 72 by 4?	
	Q: You use three words to write out a four-digit number on a cheque. List four or more numbers you could be writing. Then, write the numbers out in words. What do you notice about the numbers that you wrote?	Number • Page 63
	Q: You read two numbers greater than 1000 that are written in words. Everything is exactly the same when you read them except for two words. What could the numbers be? How are their standard forms alike? How are their standard forms different?	Number • Page 64
	Q: What are two ways to break up the number 228 to make it easier to divide it by 3?	Number • Page 101
	Q: Can every division problem be solved by multiplication? Explain.	Number • Page 103
	Q: How could you use an easier problem to help you figure out how many numbers you would say to get to 435 if you skip count by 5s?	

Math Facts		
B2.2 recall and demonstrate multiplication facts for 1 × 1 to 10 × 10, and related division facts	**Q:** You can choose any two one-digit numbers to multiply in your head. Which two numbers would you choose to make it easy for you to multiply the numbers?	Number • Page 46
	Q: Choose some single-digit numbers to complete the question. Then, solve the problem. There are X baskets. Each basket has X apples in it. How many apples might there be in the baskets altogether?	
	Q: You multiply two numbers, and the result is between 20 and 30. What two numbers might you have multiplied?	Number • Page 48
	Q: You multiplied two numbers in your head. The product was almost 100. What numbers might you have multiplied?	Number • Page 90

Mental Math		
B2.3 use mental math strategies to multiply whole numbers by 10, 100, and 1000, divide whole numbers by 10, and add and subtract decimal tenths, and explain the strategies used	**Q:** You multiply a whole number with a 7 in it by 100. What do you know for sure about the answer?	Number • Page 52
	Q: Why might someone think it is easier to multiply by 100 than to multiply by 2?	Number • Page 54

Addition and Subtraction		
B2.4 represent and solve problems involving the addition and subtraction of whole numbers that add up to no more than 10 000 and of decimal tenths, using appropriate tools and strategies, including algorithms	**Q:** David is 3815 days old. Isaac is 3815 weeks old. About how much older is Isaac than David?	Number • Page 18
	Q: What fractions do you find easy to model with pattern blocks? Which are less easy?	Number • Page 20
	Q: Which fraction do you think does not belong: ...	
	Q: Read the following statement: You are more likely to get a four-digit answer when you add two four-digit numbers than when you subtract two four-digit numbers. Do you agree or disagree with the statement? Explain why.	Number • Page 35
	Q: You subtract two large numbers and the difference is close to 350. What might the numbers have been? Explain.	
	Q: Create a sentence that includes all of these words and numbers: 4125, people, more, 2093	Number • Page 35
	Q: You added two numbers that were not very far apart in size and the total was 3159. What might the numbers have been?	
	Q: Create three very different problems that are all solved by calculating 2014 − 1999. Make sure each problem makes sense. Solve each problem using a different strategy, and explain how you solved it.	Number • Page 36
	Q: Fill in the blanks using the digits 0 to 9 to make each equation true. Use each digit only once.	
	Q: Two problems are each solved by adding two four-digit numbers and then subtracting a three-digit number from the answer. What might the problems be? Make sure they make sense.	
	Q: The world's largest-ever serving of fried chicken had a mass of 1076 kg. ...	
	Q: When you subtract a four-digit number from another four-digit number, how many digits might be in the answer? If there is more than one possibility, explain when each would occur.	Number • Page 37
	Q: How is adding 3156 to 2118 like subtracting 2118 from 3156? How is it different?	

B2.4 (continued)	**Q:** You add two numbers with decimal tenths and subtract a third number with decimal tenths. The result is a bit less than 5. What could the numbers be?	Number • Page 38
	Q: You add two numbers and the answer is 4.1. What might the numbers have been if neither was a whole number?	
	Q: A nine-year-old boy grows another 3.1 cm. How tall do you think he might be now?	
	Q: The answer is 1.7. What might the question have been?	
	Q: Fill in the blanks using the digits 0 to 9 just once each to make each equation true.	Number • Page 39
	Q: Two problems are each solved by subtracting 1.3 from another decimal. What real-life problems might these have been? Solve each one.	
	Q: Write instructions for your classmates to teach them how to subtract decimal tenths.	
	Q: How is subtracting decimals like subtracting whole numbers? How is it different?	Number • Page 40
	Q: Andrew said that 4.2 − 2 = 4.0. He showed the following calculation: ...	
	Q: How might thinking of money help you figure out 4.3 + 1.7?	
	Q: Create an addition problem and a subtraction problem that you can solve using mental math. Both problems should use one four-digit number and one two-digit number. Tell why mental math is reasonable for each problem.	Number • Page 143

Multiplication and Division		
B2.5 represent and solve problems involving the multiplication of two- or three-digit whole numbers by one-digit whole numbers and by 10, 100, and 1000, using appropriate tools, including arrays	**Q:** A story problem involves some subtraction and some multiplication. What might the problem be? Solve it.	Number • Page 48
	Q: Create a sentence using all of these words, phrases, and numbers. Add any other words, phrases, and numbers that you wish: 4, as many, 24, cookies	Number • Page 49
	Q: Which do you think does not belong?	Number • Page 52
	Q: What numbers do you think are easy to divide by 100? Why?	
	Q: You solve a problem involving multiplication and the answer is about 90. What might the problem have been?	
	Q: You multiply a whole number with a 7 in it by 100. What do you know for sure about the answer?	
	Q: Use the digits 0 to 9 once each in the blanks to make these equations all true: ...	Number • Page 53
	Q: Create three multiplication problems that use these numbers: 23, 45, 3, 10, 6, 15. Each problem should use different numbers. Then, solve the problems.	
	Q: For the following question, choose values so that the answer is greater than 300 but less than 400. None of the numbers should be of the form 0. There were X boxes. Each box had X bananas. How many bananas were there altogether? Make up two more questions with different numbers.	

B2.6 represent and solve problems involving the division of two- or three-digit whole numbers by one-digit whole numbers, expressing any remainder as a fraction when appropriate, using appropriate tools, including arrays	**Q:** You arrange some flowers into groups of equal sizes, but there are two flowers left over. How many flowers might there have been in total? How many flowers were in each group? Write the division sentence that describes it. Think of three or more possibilities.	Number • Page 47
	Q: You are arranging a class of students into equal groups. Which numbers of students have lots of possible arrangements, and which numbers of students do not have so many? Explain.	
	Q: Create a sentence that uses all of these words and numbers: 84, share, more, 3.	Number • Page 55
	Q: You divide a two-digit number by a one-digit number and the answer is greater than 20. What numbers might you have divided?	
	Q: Create and solve three problems that can be solved by dividing 54 by 2. Make the problems quite different.	Number • Page 56
	Q: Choose a value for the jump size and point A so that this picture shows a division. Explain what division it shows. Repeat with different jump sizes and different numbers for A. Notice that the jump right before 0 is a different size from all the others.	
	Q: Choose a remainder of 2, 3, or 4. Try to divide lots of two-digit numbers by one-digit numbers to get that remainder. Describe your strategy.	
	Q: In what situation might you divide 120 by 5?	Number • Page 101
	Q: You divide a three-digit number by a one-digit number, and the answer is less than 100. What numbers might you have divided? What do you notice about the hundreds digit in the three-digit number and in the one-digit number you divided by?	

B2.6 (continued)	**Q:** Choose a remainder of 2, 3, or 4. Try to divide lots of three-digit numbers by one-digit numbers to get that remainder. Describe your strategy.	Number • Page 102
	Q: You can model 150 with six base ten blocks. If you divide by 6, there is no remainder. Is it true that if you model a number with a certain number of base ten blocks, you can always divide that number by the number of blocks and there will be no remainder?	
	Q: Choose an amount of money between $300 and $400 that a class might have raised. Choose the number of charities that the class decides to split the money equally among. Figure out how much money each charity gets. Show how to get your answer in three or more ways. Repeat with a different amount of money.	
	Q: Create and solve three problems where you have to divide 144 by 2. Make the problems seem quite different.	
	Q: How can you predict how many digits will be in the answer when you divide a three-digit number by a one-digit number?	Number • Page 103
	Q: What are three ways to estimate ...?	
	Q: Show that it is possible to divide different three-digit numbers by different one-digit numbers but end up with the same answer. Tell why ending up with the same answer is not surprising.	
	Q: Choose a division involving a three-digit number that would be easy to do. Explain your thinking.	

B2.7 represent the relationship between the repeated addition of a unit fraction and the multiplication of that unit fraction by a whole number, using tools, drawings, and standard fractional notation	There are no Grade 4 Open Questions that meet this 2020 curriculum expectation.	

B2.8 show simple multiplicative relationships involving whole-number rates, using various tools and drawings	**Q:** A two-digit number is double one number and is also half another number. What might the numbers be?	Number • Page 10
	Q: Suppose you know how many quarters make $100. What other dollar amounts in quarters would you know?	Number • Page 18
	Q: How might knowing that there are 60 seconds in a minute help you solve other math problems involving time?	
	Q: A certain magic pot returns three times as many things as you put into it. For example, if you put in one coin, three coins come out. What are some total numbers of coins between 30 and 40 you could end up with? What are some you could not end up with? Explain.	Number • Page 47
	Q: Which one of these phrases do you think doesn't belong? ...	Number • Page 49
	Q: Fill in the blanks to make this sentence true: __ is a little less than double ____ .	
	Q: Fill in the blanks so that the first number is greater than 30. The number ___ is ____times as many as _____ .	
	Q: Create a spinner where the area of the red sections is double the area of the green sections, and the area of the blue sections is triple the area of the red sections. How many sections could your spinner have? Are there other possibilities?	Number • Page 50
	Q: Choose numbers for the blanks so that all the statements are true. Draw pictures to show why each statement is true. ...	
	Q: Create a story about a magic pot that multiplies the length of anything that goes into it by 5. The story has to use actual measurements.	
	Q: Why do you think speed limit signs on the highway are posted in kilometres per hour, instead of kilometres per two hours or three hours or four hours?	Number • Page 51
	Q: When do you think it might be more useful to think of 20 as two 10s instead of as 5 more than 15? When do you think it might be more useful to think of 20 as 5 more than 15?	
	Q: Which is more likely: that a number that is four times another number is also a double of some number or a number that is four times another number is also a triple of some number? Why?	
	Q: Decide on a price for 12 cookies. At that rate, what should 9 cookies cost?	Number • Page 55
	Q: You are creating a bar graph. The lowest value to be graphed is 24 and the highest value is 95. What scale would you use? Why?	

B2.8 (continued)	**Q:** You are creating a bar graph. The lowest value to be graphed is 24 and the highest value is 95. What scale would you use? Why?	Number • Page 55
	Q: How would knowing how much four packages of something cost help you figure out how much six packages of the same thing would cost?	Number • Page 57
	Q: How is deciding how many bags of 3 cookies you can make from 68 cookies like figuring out how to share 68 cookies among three people?	

Grade 4: 2020 Ontario Curriculum Expectations	Open Questions for the Three-Part Lesson: *Measurement • Patterning & Algebra* [MPA]	G4–8 Book & Page Number
C. ALGEBRA		
C1. Patterns and Relationships **Overall Expectation:** By the end of Grade 4, students will identify, describe, extend, create, and make predictions about a variety of patterns, including those found in real-life contexts		
Patterns		
C1.1 identify and describe repeating and growing patterns, including patterns found in real-life contexts	**Q:** Use a multiplication table to find at least three patterns. Then, explain the patterns.	Number • Page 47
	Q: Describe three growing patterns in the multiplication table. Explain each pattern.	MPA • Page 35
	Q: Describe a pattern rule in words for a shrinking pattern. Show the first six terms of your pattern in a table of values.	MPA • Page 37
C1.2 create and translate repeating and growing patterns using various representations, including tables of values and graphs	**Q:** Create a growing pattern that has a pretty big fifth term. What is your pattern rule?	MPA • Page 34
	Q: A shrinking pattern includes the numbers 500 and 40. What might the pattern rule be?	
	Q: The fourth number in a growing pattern is 18. What might the pattern be?	
	Q: Create a growing pattern that involves multiplying by 2 and includes the number 80. Can your pattern include the number 2?	
	Q: A shrinking pattern shrinks very slowly. The 30^{th} term is close to 150. What could the pattern be?	MPA • Page 36
	Q: Create four repeating patterns that have cores of different lengths where the 40^{th} term would be 10.	
	Q: Create a repeating geometric pattern that has four times as many squares as circles.	MPA • Page 38
	Q: A repeating reflection pattern includes this section: What could the core be?	MPA • Page 39
	Q: The 30^{th} term of a repeating shape pattern is a blue rectangle. What might the pattern look like? Create three possible patterns. Use a different length of core in each pattern and make each core at least three terms long.	MPA • Page 40

C1.2 (continued)	**Q:** A repeating pattern has a core of 6 terms. The 10th term is a triangle. What might the pattern look like? Create 3 possible patterns. Express each pattern rule in words.	MPA • Page 40
	Q: Create a repeating pattern that involves horizontal and vertical reflections. Describe your pattern.	MPA • Page 41
	Q: A repeating pattern is made of pattern blocks. The total area of the core of the pattern is the same area as 11 green triangles. What might the pattern look like?	
	Q: A repeating shape pattern is created using some horizontal reflections, some vertical reflections, and some slanted reflections. What might the pattern look like?	
	Q: It's really easy to predict the 50th term of a repeating shape pattern. What might the pattern be? Why would it be easy to predict the 50th term?	MPA • Page 42
	Q: The 30th, 45th, and 75th terms of a repeating shape pattern are all rectangles. What might the core be? Explain.	
	Q: The 7th term of a repeating reflection pattern looks the same as the 43rd term. What can you say about the core? Explain.	
C1.3 determine pattern rules and use them to extend patterns, make and justify predictions, and identify missing elements in repeating and growing patterns	**Q:** Choose numbers for this pattern rule so that the pattern includes 22. Start at ___ and add ___ each time. Show your pattern on a number line.	MPA • Page 34
	Q: The pattern 2, 1, 3, 2, 1, 3, 2, 1, 3, … has a core of 2, 1, 3. What term near the 100th term is a 3?	MPA • Page 35
	Q: A pattern starts at a number of your choice and goes up by 5, then 10, then 15, then 20, then 25, then 30, and so on. Create a table of values for the first 5 rows of your pattern. Explain how you would figure out the 15th term without writing all the terms.	
	Q: Choose a jump size for a pattern that starts at 0. Show the pattern in the landing spots in a table of values. What do you notice about the ones digits and the tens digits? Try again with a different jump size.	MPA • Page 36
	Q: A pattern rule involves multiplying each term by the same number to get the next term. How could a number between 500 and 1000 be in the pattern?	MPA • Page 37
	Q: For a certain repeating pattern, it is really quick to figure out the 60th number once you know the core. What could the core be? Why is it quick to figure out the 60th number?	
	Q: Do you think that it's easier to predict the 40th term of a repeating pattern or the 40th term of a growing pattern? Why?	
	Q: Choose numbers for the blanks in this rule for a shrinking pattern: Start at ___ and subtract ___ each time. What would the 10th and 20th terms in the pattern be?	

C1.3 (continued)	**Q:** It's a little easier for you to predict the 15th term in a repeating shape pattern than the 16th term. What might the core be? Explain your thinking.	MPA • Page 38
	Q: Is it possible to have a repeating reflection pattern with a core of three terms? If it is possible, what might it look like?	MPA • Page 43
C1.4 create and describe patterns to illustrate relationships among whole numbers and decimal tenths	There are no Grade 4 Open Questions that meet this 2020 curriculum expectation.	

C2. Equations and Inequalities **Overall Expectation:** By the end of Grade 4, students will demonstrate an understanding of variables, expressions, equalities, and inequalities, and apply this understanding in various contexts		
Variables		
C2.1 identify and use symbols as variables in expressions and equations	**Q:** You choose a number. You multiply by , then you multiply by , and then you divide by. You end up with 3 times the number you started with. What numbers might go in the blanks? Think of lots of possibilities, and explain each choice. The three numbers you choose can be different or the same.	MPA • Page 45
	Q: What two quantities can you think of that are related? How are they related? (For example, hours and minutes are related.)	MPA • Page 81
Equalities and Inequalities		
C2.2 solve equations that involve whole numbers up to 50 in various contexts, and verify solutions	**Q:** You figured out the missing number in a multiplication equation, and you thought it was really easy. What might the equation be, and why did you think it would be really easy?	MPA • Page 44
	Q: What could the missing numbers in this equation be? Think of lots of possibilities.	MPA • Page 46
	Q: A multiplication equation has a missing factor. You figure out that the missing factor is 8. What might the equation be?	MPA • Page 47
	Q: Choose a two-digit number you can write as a product of 2 one-digit numbers. Show how to write your number as the product of 3 numbers.	
C2.3 solve inequalities that involve addition and subtraction of whole numbers up to 20, and verify and graph the solutions	There are no Grade 4 Open Questions that meet this 2020 curriculum expectation.	

C3. Coding **Overall Expectation:** By the end of Grade 4, students will solve problems and create computational representations of mathematical situations using coding concepts and skills		
Coding Skills		
C3.1 solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves sequential, concurrent, repeating, and nested events	There are no Grade 4 Open Questions that meet these 2020 curriculum expectations.	
C3.2 read and alter existing code, including code that involves sequential, concurrent, repeating, and nested events, and describe how changes to the code affect the outcomes		

C4. Mathematical Modelling **Overall Expectation**: By the end of Grade 4, students will apply the process of mathematical modelling to represent, analyse, make predictions, and provide insight into real-life situations		
This overall expectation has no specific expectations. Mathematical modelling is an iterative and interconnected process that is applied to various contexts, allowing students to bring in learning from other strands. Students' demonstration of the process of mathematical modelling, as they apply concepts and skills learned in other strands, is assessed and evaluated.	**Q:** Do some research about masses of foods to estimate about how many kilograms of food you eat in an average day.	MPA • Page 23
	Q: If you know that there are six granola bars in a package, how would you figure out how many packages a school might need to buy to have enough for everyone in the school?	Number • Page 17
	Q: You would eat 10 000 apples in about 27 years if you ate one apple a day. What could you say is true about 10 000 of something else? It could be 10 000 steps, 10 000 people, or 10 000 blades of grass. Think of four or more examples.	
	Q: How long would it take for at least two of these to happen? • brushing your teeth 10 000 times • eating 10 000 calories worth of pizza ... Explain how you figured out your answers.	
	Q: The number 3000 is the answer to a real-life problem that needs to be solved in more than one step. Describe problems where 3000 might be an answer that makes sense.	Number • Page 18

Grades 4–8 • Open Questions for the Three-Part Lesson:
Geometry and Spatial Sense • Data Management and Probability [GSSDP]

2020 Ontario Curriculum Expectations	Open Questions for the Three-Part Lesson: *Geometry and Spatial Sense • Data Management and Probability*	Book Page #
D. DATA		
D1. Data Literacy **Overall Expectation:** By the end of Grade 4, students will manage, analyse, and use data to make convincing arguments and informed decisions, in various contexts drawn from real life		
Data Collection and Organization		
D1.1 describe the difference between qualitative and quantitative data, and describe situations where each would be used	There are no Grade 4 Open Questions that meet this 2020 curriculum expectation.	
D1.2 collect data from different primary and secondary sources to answer questions of interest that involve comparing two or more sets of data, and organize the data in frequency tables and stem-and-leaf plots	**Q:** When might you choose to collect data related to an activity that you do outside of school? How might you record the results?	GSSDP • Page 28
	Q: A survey is designed to help students plan for a field trip. What might the survey question be? Split your classmates into two groups based on where they sit, and ask each group your survey question. Display the data on a double bar graph, and include a legend to show which coloured bar represents each group. Tell what your graph shows about the data.	GSSDP • Page 29
	Q: What do you think is a recent experience that a little more than half of your classmates have had? Why do you think this? Collect data from your classmates about whether they had this recent experience. Then, display the data in a graph, and compare your findings to your prediction.	
	Q: Choose something that Grade 4 students can do a lot of times in 2 minutes. Ask half of your classmates to perform this task, and collect the results. Then, display the results on a stem-and-leaf plot and a bar graph.	GSSDP • Page 30

D1.2 (continued)	**Q:** Owen has collected some data. He thinks that it's better to display the data values on a double bar graph than on a stem-and-leaf plot. What might his data be? Annie has collected different data. She thinks that she can display her data on either a stem-and-leaf plot or a single bar graph. What might her data be?	GSSDP • Page 31
	Q: The principal of our school would like to make our school a better place to learn. What survey question(s) could you ask people in our school to help our principal investigate how this could be done? Who and how many people would you survey? Explain your answer.	
	Q: Sarah thinks that the best way to display a set of data is to use a stem-and-leaf plot. What might the set of data be about? What might the data values be? What might the stem-and-leaf plot look like?	
	Q: Collect data from a newspaper, and display it in two ways. Tell what each way highlights about the data. Then, tell some things that each way doesn't highlight.	GSSDP • Page 34
	Q: Imagine that you are looking at a stem-and-leaf plot or double bar graph after conducting an experiment with your classmates. Then, do the following:	GSSDP • Page 36
Data Visualization		
D1.3 select from among a variety of graphs, including multiple-bar graphs, the type of graph best suited to represent various sets of data; display the data in the graphs with proper sources, titles, and labels, and appropriate scales; and justify their choice of graphs	There are no Grade 4 Open Questions that meet these 2020 curriculum expectations.	
D1.4 create an infographic about a data set, representing the data in appropriate ways, including in frequency tables, stem-and-leaf plots, and multiple-bar graphs, and incorporating any other relevant information that helps to tell a story about the data		

Data Analysis		
D1.5 determine the mean and the median and identify the mode(s), if any, for various data sets involving whole numbers, and explain what each of these measures indicates about the data	**Q:** Write 5 two-digit numbers that increase in value. The middle number must be much closer to the least number than the greatest number. Then, write 5 different two-digit numbers that increase in value. This time, the middle number must be much closer to the greatest number than the least number.	GSSDP • Page 32
	Q: You ask each of your classmates to perform an experiment from which the results will be numbers. What might the experiment be? Ask your classmates to perform this experiment. Collect the results, and display them on a graph. Tell what the median of the results is. Then, describe how the data values are distributed in your graph.	GSSDP • Page 33
	Q: Create a data set with 8 to 10 values for each of the following situations: A. a set with a median of 8 and a narrow range of data B. a set with a median of 8 and a wide range of data C. a set where the mode and the median are the same number D. a set where the mode and the median are far apart	
	Q: In what situation might it be more helpful to know the median rather than the mode of a set of data? In what situation might it be more helpful to know the mode rather than the median? Explain your answer.	GSSDP • Page 35
	Q: The median on a graph is easy to see. What might the graph look like? The median on another graph is not so easy to see. What might the graph look like?	GSSDP • Page 36
	Q: Use an even number of counters to make two trains of counters that are different lengths. Tell how many counters are in each of your trains. Then, move counters from your longer train to your shorter train so that your two trains are the same length. Tell how many counters each of your trains have now.	GSSDP • Page 70

D1.6 analyse different sets of data presented in various ways, including in stem-and-leaf plots and multiple-bar graphs, by asking and answering questions about the data and drawing conclusions, then make convincing arguments and informed decisions	**Q:** What might this graph be about? What information could you add to it so that it makes sense?	GSSDP • Page 28
	Q: Use numbers to talk about this graph.	GSSDP • Page 32
	Q: Use linking cubes to make five towers of different heights. Line the towers up randomly in a row, and describe how their heights change across the row. Repeat for at least one other set of towers.	
	Q: Ask the same survey question to two different groups of people, and collect and organize the results. Describe the shape of the data from each group, and tell what similar and different conclusions you can draw about the two sets of data.	GSSDP • Page 33
	Q: You ask each of your classmates to perform an experiment from which the results will be numbers. What might the experiment be? Ask your classmates to perform this experiment. Collect the results, and display them on a graph. Tell what the median of the results is. Then, describe how the data values are distributed in your graph.	
	Q: Tell all the things that you notice about the data in the graph below. What conclusions can you make based on the data? What are some conclusions that you can't make based on the data?	GSSDP • Page 34
	Q: Two graphs have a lot of the same values as each other, but the shape of the data in each one is much different. What might the graphs look like? Tell how different shapes of data can tell different stories.	GSSDP • Page 35
	Q: Imagine that you are looking at a stem-and-leaf plot or double bar graph after conducting an experiment with your classmates. Then, do the following:	GSSDP • Page 36
	Q: The median on a graph is easy to see. What might the graph look like? The median on another graph is not so easy to see. What might the graph look like?	
	Q: How are these graphs similar? How are they different?	GSSDP • Page 70

D2. Probability **Overall Expectation:** By the end of Grade 4, students will describe the likelihood that events will happen, and use that information to make predictions		
D2.1 use mathematical language, including the terms “impossible”, “unlikely”, “equally likely”, “likely”, and “certain”, to describe the likelihood of events happening, represent this likelihood on a probability line, and use it to make predictions and informed decisions	**Q:** You draw a linking cube from a bag. You put it back in, and then you draw another cube. You get these results: Draw 1 Draw 2 What conclusions could you make regarding this experiment?	GSSDP • Page 37
	Q: A coin is flipped and turns up heads three times in a row. Chiran predicts that the coin will turn up heads next time because that’s what happened the last three times. Adrian predicts that it will turn up tails next because it’s time for it to turn up tails. Which person do you agree with? Why?	
	Q: You draw the 5 of diamonds from the top of a deck of playing cards and put it aside. Use the following words to talk about what would happen when you draw the next card.	
	Q: You overhear someone say, “I predict that the spinner will land on blue a lot more than yellow.” Draw what the spinner might look like.	
	Q: Pick a number from 10 to 20. If you flipped a pair of coins this many times, predict how many times you would get the following results: 1. 2 heads 2. 2 tails 3. 1 head and 1 tail Explain your thinking. Test your prediction two or three times by flipping the coins the number of times that you chose. Then, explain what your test results show.	GSSDP • Page 38
	Q: When drawing cards from a set of playing cards, what are some things that are likely to happen? What are some things that are unlikely to happen?	GSSDP • Page 194

D2.2 make and test predictions about the likelihood that the mean, median, and mode(s) of a data set will be the same for data collected from different populations	**Q:** Place 10 linking cubes in a bag, and record how many of each colour of cube you place in it. Then, do the following: ...	GSSDP • Page 38
	Q: Make a spinner with different coloured sections. Spin its arrow 30 times, and record the result after each spin. Without showing your partner your spinner, tell your partner what the results were after 5 spins, and ask him or her to sketch what your spinner might look like. Next, share the results after 10 spins, and have your partner sketch a new spinner if necessary. Then, repeat for the results after 30 spins. Ask your partner to explain each of his or her sketches. Together, tell why it's helpful to know as many previous test results as possible when making probability predictions.	GSSDP • Page 39
	Q: Mary asks our class, "What are you likely to do after school today?" Her conclusions change as she is collecting the results. Why might that be?	
	Q: What might the probability of drawing certain cards from a deck of cards be? Explain your answer.	GSSDP • Page 39
	Q: You take the same measurement from two different groups of people. The means of the measurements in each group are a lot different from each other. Whom and what might you have measured? What might the means be for each group?	GSSDP • Page 108

E. SPATIAL SENSE		
E1. Geometric and Spatial Reasoning **Overall Expectation:** By the end of Grade 4, students will describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them		
Geometric Reasoning		
E1.1 identify geometric properties of rectangles, including the number of right angles, parallel and perpendicular sides, and lines of symmetry	**Q:** These line segments These line segments are parallel lines: perpendicular lines: Describe some objects that show parallel and perpendicular lines.	GSSDP • Page 120
Location and Movement		
E1.2 plot and read coordinates in the first quadrant of a Cartesian plane, and describe the translations that move a point from one coordinate to another	**Q:** A blank 100-chart is set up like this. Tell where on the chart that I might find the following: a very large number, a number that has a greater number in the tens place than in the ones place, a family member's age, two numbers where one is exactly twice the other. Tell why you are right each time.	GSSDP • Page 23
	Q: Sit on one of the circles, and tell where you are sitting by using the letter and number labels. Then, tell where two or three of your classmates are sitting.	
	Q: What might you add to this grid to make it easy to describe where the circle is?	GSSDP • Page 53

E1.2 (continued)	**Q:** Jack says that it is most useful to have coordinates on a map. Annabelle says that it is most useful to have the cardinal directions on a map. When might each person be right? Use a map to show your thinking.	GSSDP • Page 58
	Q: Draw a picture of a familiar room on centimetre grid paper so that it is in the first quadrant of a Cartesian coordinate plane. Use coordinates to tell which points some of the objects in the room are located at.	GSSDP • Page 95
	Q: Imagine that your geoboard is the first quadrant of a Cartesian coordinate plane. Make a triangle somewhere in the centre of your geoboard. Tell the coordinates of each of its vertices. Then, shift each vertex of your triangle 2 pegs right and 1 peg up. Tell the new coordinates of each vertex. Repeat for one or more other polygons. Tell what you notice.	
	Q: The birthdays of a group of students are plotted in the first quadrant of a Cartesian coordinate plane that looks like this: ...	GSSDP • Page 96
	Q: What different ways could you describe where you are located at this moment?	GSSDP • Page 128
	Q: What do you think the coordinates might be for the bull's eye (the black dot below)? What do you think the coordinates could be for a point in the blue ring?	
E1.3 describe and perform translations and reflections on a grid, and predict the results of these transformations	**Q:** You overhear someone say the word "reflection." What might this person be talking about?	GSSDP • Page 21
	Q: Two students pose in an interesting way to look like a reflection of each other. With a partner, show what they might look like.	
	Q: Make an interesting design using square tiles. Place a transparent mirror horizontally above your design, and use more tiles to show what a reflection of it would look like. Repeat these steps while placing the mirror beside your design vertically and then beside it diagonally.	GSSDP • Page 22
	Q: On the grid to the right, Logan moved up 2 times and right 2 times. Where might he have started, and where might he have ended? Where couldn't he have started or ended? Why?	GSSDP • Page 24
	Q: Make a design out of six to eight pattern blocks. Next, have a partner make your design out of pattern blocks. Then, place a barrier between you and your partner so that neither person can see the other's design. Next, translate three of your pattern blocks. Tell your partner how you translated each block, and ask your partner to translate his or her pattern blocks in the same way. Then, compare your designs.	GSSDP • Page 57

E1.3 (continued)	**Q:** Make an irregular quadrilateral on a geoboard. Without showing your partner your shape, have him or her recreate it on another geoboard. Pick one of your shape's vertices to be your starting spot. Have your partner start at this spot on his or her geoboard, and direct him or her to where the other vertices of the quadrilateral should be by using the cardinal directions and having the top of the board be north. Then, compare your quadrilaterals.	GSSDP • Page 57
	Q: Choose a shape, and draw it in a square of a grid like the one to the right. Then, imagine that the shape is moved by means of reflections and/or translations to a spot far away on the grid. Draw the shape in this second grid square. Show and explain how the shape could have moved to its new location in three different ways. Tell how the ways are alike and different.	GSSDP • Page 59
	Q: Build a design out of pattern blocks that has more than one line of symmetry.	GSSDP • Page 88
	Q: Sketch a shape with exactly one line of symmetry. Then, sketch a shape with more than one line of symmetry.	
	Q: How could you describe where some objects are located in this room?	GSSDP • Page 94
	Q: What information would you include with the following grid to help someone get from one shape to the other?	
	Q: Choose 2 two-digit numbers on the chart. The first number's tens digit should be a little bit more than double the other number's tens digit. The numbers must be in different columns. Tell two different ways how you could get from one of your numbers to the other on the chart.	
	Q: Draw a triangle. Reflect it using a slanted reflection line.	GSSDP • Page 38
	Q: Dylan and Anissa created the same pattern, but Dylan's rule involved reflecting horizontally and Anissa's rule involved reflecting vertically. How is that possible?	GSSDP • Page 43

Grades 4–8 • Open Questions for the Three-Part Lesson: *Measurement • Patterning & Algebra* [MPA]

E2. Measurement **Overall Expectation:** By the end of Grade 4, students will compare, estimate, and determine measurements in various contexts		
The Metric System		
E2.1 explain the relationships between grams and kilograms as metric units of mass, and between litres and millilitres as metric units of capacity, and use benchmarks for these units to estimate mass and capacity	**Q:** Find something in the classroom that you think has a mass of about 100 g. Test your prediction.	MPA • Page 22
	Q: What objects have a mass of about 1 kg?	
	Q: You have one 400 g mass, three 100 g masses, six 50 g masses, five 20 g masses, and twenty 5 g masses. What combinations of these masses could you use to have 1 kg?	MPA • Page 23
	Q: Why might a nurse use grams, not kilograms, to measure newborn babies?	MPA • Page 24
	Q: A container of apple juice is marked as 1 L. About how many children could that amount serve?	MPA • Page 25
	Q: How many of the smallest scoop does it take to fill the 1 L container? How many of the second-smallest scoop, the second-biggest scoop, and the biggest scoop does it take to fill the 1 L container? Which scoop would you need if you wanted to use 10 of them to fill the 1 L container?	MPA • Page 26
	Q: When would you use millilitres to measure capacity instead of litres?	MPA • Page 27
E2.2 use metric prefixes to describe the relative size of different metric units, and choose appropriate units and tools to measure length, mass, and capacity	**Q:** A bag of frozen peas is marked as 900 g. About how many servings would that make? Explain.	MPA • Page 22
	Q: About how much heavier is a cup filled with water than an empty cup?	
	Q: Choose a breed of dog that you like. Find out the average mass of a puppy and a grown dog of this breed. Put together objects that have about the same total mass as a puppy of this breed.	MPA • Page 23
	Q: Do some research about masses of foods to estimate about how many kilograms of food you eat in an average day.	
	Q: What is a reasonable estimate for the mass of a computer printer? Why did you choose that value?	MPA • Page 24
	Q: Estimate the amount of water you drink in a day. What size of container could hold this amount? Explain your estimate.	MPA • Page 25
	Q: Investigate the capacities of the bowls in a set of mixing bowls. What do you notice about their capacities?	MPA • Page 26

Time		
E2.3 solve problems involving elapsed time by applying the relationships between different units of time	**Q:** Keegan's grandpa is a little less than 7 and one-half decades old. How old might he be?	MPA • Page 28
	Q: Emma's brother has gone to school for 82 months. What grade might he be in?	
	Q: How much time has passed?	
	Q: About how long is 1000 weeks? Describe it using two or more different time units.	MPA • Page 29
	Q: Research some events that occurred about six centuries ago and some that occurred about six decades ago.	
	Q: You do three activities in about two hours. The second activity takes twice as much time to do as the first activity. The third activity takes twice as much time to do as the second activity. There are 10-minute breaks between the activities. How long might each activity be? What is the total amount of time?	
	Q: Suppose your birthday is on a Sunday this year. On what day of the week will your birthday be next year?	
	Q: Show a schedule for your whole day on a school day. Include the start time for each activity in your day. Tell how long each part of the day takes.	MPA • Page 30
	Q: You practise the violin for half an hour every day except Sunday. How long will it be before you have practised for 100 hours?	MPA • Page 31
	Q: A flight from Ottawa to Montreal takes 39 minutes. What time might the flight leave Ottawa and arrive in Toronto?	
	Q: At Sonia's house, a big dinner began at □:55 p.m. and ended at□:45 p.m. Choose reasonable values for the two times. How long might dinner have lasted?	
	Q: What numbers could go in the blanks? centuries = decades Compare the numbers in the blanks. What do you notice?	
	Q: Nolan's little sister took a nap for 3 hours and 10 minutes. Show what a clock might have looked like when she went to sleep and when she got up.	
	Q: Fill in the blanks with the names of two months. How many days apart are these dates?	MPA • Page 65

E2.3 (continued)	**Q:** Fill in the blanks to make the following statement true: An event that is ___hours long is just slightly longer than an event that is ___days long.	MPA • Page 65
	Q: If someone sleeps about 8 12 hours per night, when might he or she go to sleep and get up?	
	Q: Which length of time doesn't belong?	
	Q: An event took 3 weeks, 2 days, 11 hours, and 7 minutes. When could the event have started and ended?	MPA • Page 66
	Q: How much time is there between 13:14 and 15:16? What other times would be the same amount of time apart where the numbers representing the hour and minutes in each time are also consecutive numbers, like 13, 14, 15, and 16?	
	Q: Choose a date and time as a start time. What date and time will it be 1000 days + 1000 hours + 1000 minutes from that start time?	
	Q: What might happen over 10 000 minutes? Think of several possibilities.	
	Q: Your friend came to your home at 11:00 and left after 16:00 the same day. Use both a 12-hour clock and a 24-hour clock to tell what time your friend left. How long could he or she have been at your home?	
	Q: Do you think we should use only 12-hour clocks, only 24-hour clocks, or both types of clocks? Explain your reasons.	MPA • Page 67
	Q: You have to convert 300 of one time unit to a different time unit. What units would make the conversion easy? Why?	
	Q: What do you think is the biggest advantage of using 12-hour times instead of 24-hour times?	
	Q: Suppose your birthday and your friend's birthday were 49 days apart. What else would you know about the two birthdays?	
	Q: Choose values for the blanks to make a time. Show what that time would look like on an analogue clock.	
	Q: The time is __:00. It is after 12:00 p.m. and before 6:00 p.m. Fill in the blank, and then draw a clock like the one here. Show the time on your clock by drawing an hour and a minute hand. Is the angle of the arms that you drew bigger than, smaller than, or the same as a right angle? Tell how you know. Repeat this exercise one or two more times.	Grades K–3 GSSDP • Page 107

Grades K–3 and Grades 4–8 • Open Questions for the Three-Part Lesson: *Geometry and Spatial Sense • Data Management and Probability* [GSSDP]

Grades 4–8 • Open Questions for the Three-Part Lesson: *Measurement • Patterning & Algebra* [MPA]

Angles		
E2.4 identify angles and classify them as right, straight, acute, or obtuse	**Q:** These are two angles: Tell how they are similar and how they are different.	Grades K–3 GSSDP • Page 106
	Q: Which of these pictures is the most different from the others?	
	Q: This is a right angle: Make three angles on a geoboard for each of the following descriptions: A) less than a right angle; B) greater than a right angle; C) equal to a right angle. Compare your angles with those of a square pattern block to show that they are less than, greater than, or equal to a right angle. Grade K–3	Grades K–3 GSSDP • Page 107
	Q: Make three shapes on a geoboard for each of the following descriptions: ...	Grades K–3 GSSDP • Page 108
	Q: How is it possible for a right angle to be made from two long lines or two short lines? Explain your thinking.	
	Q: A triangle has a right angle. What do you know for sure about the triangle? What are you not so sure about?	
	Q: Which angle do you think is the least like the others?	GSSDP • Page 10
	Q: You look at three clocks. The hands on the first one make a straight angle, the hands on the second one make a right angle, and the hands on the third one make less than a right angle. About what time could each clock be showing? Sketch what time each clock could be showing, and use a tool to show that your angles are correct.	GSSDP • Page 11
	Q: A quadrilateral with an angle greater than 90° must also have an angle that is less than 90°. Use a geoboard and a tool to show that this is true.	
	Q: Sketch three or four quadrilaterals that look a lot different from one another. Make sure that each angle inside your quadrilaterals is less than a straight angle. Tell how many of the angles in your shapes are acute angles, obtuse angles, and right angles.	GSSDP • Page 45
	Q: Zelia sketches a polygon that has more than two obtuse angles. What shape could she have made? What shape could she not have made?	GSSDP • Page 46

E2.4 (continued)	**Q:** Draw sorting hoops that are arranged like this: Has a Right Angle Has an Acute Angle Has an Obtuse Angle Then, draw a variety of polygons while sorting them into the hoops. Make sure that there is at least one polygon in each section of the hoops.	GSSDP • Page 46
	Q: Where might you see acute, obtuse, right, or straight angles in the classroom? Use a tool to show that you are correct for each type of angle.	GSSDP • Page 84
	Q: A given angle is an obtuse angle. What do you know for sure about the angle? What are you not so sure about the angle?	GSSDP • Page 87
	Q: Make a triangle that has an angle that is less than half a right angle. Then, measure all three of its angles using a protractor, and tell which angle is the largest.	GSSDP • Page 120

Area		
E2.5 use the row and column structure of an array to measure the areas of rectangles and to show that the area of any rectangle can be found by multiplying its side lengths	**Q:** One rectangle has an area that is 6 cm^2 more than another rectangle.	GSSDP • Page 17
	Q: Which rectangle do you think has a greater area? Why?	
	Q: On centimetre grid paper, draw a rectangle and calculate its area. If you make the length of your rectangle 1 cm longer and the width 1 cm shorter, will the area increase or decrease? Explain your thinking.	
	Q: Use square tiles to build three or more rectangles that have the same area. What is the area of the rectangles? What are the dimensions of the rectangles?	GSSDP • Page 18
	Q: Two rectangles that are not identical have the same area. What might their lengths and widths be?	GSSDP • Page 21
	Q: A rectangle has side lengths that are whole numbers of centimetres and an area that is an odd number of square centimetres. What else do you know about that rectangle?	
	Q: A rectangle has side lengths between 1 and 10 cm long. What do you know for sure about the area of the rectangle?	
	Q: Each side of a rectangle is a whole number of centimetres long. How likely is it that both the area and perimeter of the rectangle will be even numbers? How likely is it that they will both be odd numbers? Explain.	MPA • Page 55

E2.5 (continued)	**Q:** Construct as many squares of different sizes as you can on a geoboard. What is the area of each square?	MPA • Page 56
	Q: Build a rectangle and measure its area and perimeter. Build another rectangle with half that area. What fraction of the larger perimeter is the smaller perimeter? Repeat with several different rectangles. Does the fraction change?	
	Q: On grid paper, draw a polygon that you can divide in half so that the area of both halves is the same, but the perimeter of one half is about double the perimeter of the other half.	
	Q: The perimeter of a rectangle is triple its length. What could the length and width of the rectangle be?	MPA • Page 57
	Q: The area of Rectangle A is twice the area of Rectangle B. The perimeter of Rectangle A is 20 units greater than the perimeter of Rectangle B. What could the dimensions of the two rectangles be?	
	Q: A rectangle is long and thin. What might the relationship be between the number of centimetres in the perimeter and the number of square centimetres in the area?	MPA • Page 58

E2.6 apply the formula for the area of a rectangle to find the unknown measurement when given two of the three	**Q:** The base of a rectangular house has a perimeter of 50 m. How long might its length and width be?	MPA • Page 52
	Q: One rectangle has an area that is 1 cm^2 greater than the area of another rectangle. How is that possible?	MPA • Page 55
	Q: Draw a shape that has a big perimeter but not a big area. Can you also draw a shape with a big area but not a big perimeter? Explain.	
	Q: A rectangle with side lengths measured in whole numbers has an area of □□0 cm^2. What do you know for sure about the side lengths?	MPA • Page 58
	Q: Do you think it is easier to construct a rectangle with a perimeter of 20 cm or an area of 20 cm^2? Explain.	MPA • Page 92
	Q: Use square tiles to construct a square with a perimeter greater than 30 tile sides. How many tiles did you use? How many tiles would you need to construct the next biggest square you could make with tiles?	MPA • Page 95

F. FINANCIAL LITERACY		
F1. Money and Finances **Overall Expectation:** By the end of Grade 4, students will demonstrate an understanding of the value of Canadian currency		
Money Concepts		**G4–8 Book & Page #**
F1.1 identify various methods of payment that can be used to purchase goods and services	There are no Open Questions that meet these 2020 curriculum expectations.	
F1.2 estimate and calculate the cost of transactions involving multiple items priced in whole-dollar amounts, not including sales tax, and the amount of change needed when payment is made in cash, using mental math	**Q:** Jane bought school supplies. She spent more than $122 in one store and almost $90 in another store. Choose the exact amounts in whole dollars that she spent. Then, using mental math, figure out how much she spent in total. Describe your strategies.	Number • Page 90
	Q: Three shirts cost $29, $49, and $62. You are going to buy more than one of at least one shirt. Using mental math, calculate how much you would spend. Describe your thinking.	Number • Page 91
	Q: You spent almost $600 buying several of the same item. Using mental math, figure out how many items you bought and what each item each cost. Think of three or more possibilities.	Number • Page 143
Financial Management		
F1.3 explain the concepts of spending, saving, earning, investing, and donating, and identify key factors to consider when making basic decisions related to each	There are no Grade 4 Open Questions that meet these 2020 curriculum expectations.	
F1.4 explain the relationship between spending and saving, and describe how spending and saving behaviours may differ from one person to another		
Consumer and Civic Awareness		
F1.5 describe some ways of determining whether something is reasonably priced and therefore a good purchase	There are no Grade 4 Open Questions that meet this 2020 curriculum expectation.	

Grade 4 Open Questions that now align with other grades in the Ontario 2020 Curriculum

Grade and 2020 Ontario Expectations		Grade 4–8 Book & Page #
Grade 4 Open Questions that now align with Grade 2 expectations		
Grade 2 **F1.1**	**Q:** Describe a situation when you start with 15 coins, trade some coins for coins of equal value, and end up with 11 coins.	Number • Page 41
	Q: You represent an amount of money with 28 coins, including 13 quarters. How many other coins (not 28) might you have used to represent that same amount? Explain.	
	Q: You show an amount of money using three or more bills and five or more coins. What might that amount be? What bills and coins might you have used? How could you show that amount of money with a different number of bills and coins?	
	Q: You have a certain amount of money worth less than $20. You trade coins and bills so that you have more bills and fewer coins but the same value of money. Describe the bills and coins you started and ended with. Think of three or more possibilities.	Number • Page 42
	Q: Is it always possible to show any amount of money worth more than $1 at least two ways with coins and/or bills? Explain.	Number • Page 43
Grade 4 Open Questions that now align with Grade 3 expectations		
Grade 3 **F1.1**	**Q:** Why do you think that some people add up to count change?	Number • Page 41
	Q: Why might you end up getting more coins in change than the number of coins you used to pay for the item?	Number • Page 43
Grade 3 **B1.1**	**Q:** Find in the media (in newspapers, in magazines, or on the Internet) some examples of numbers greater than 100 but less than 1000 that are written out in words. What do these numbers represent? How would you write the numbers in standard form?	Number • Page 11
	Q: How many words might you need to write a number that is less than 1000? What numbers do you need a lot of words to write? What numbers do you not need many words to write?	
	Q: List four numbers less than 1000 that you could write using only two words. Write the numbers out in words. List four numbers you could not write out using only two words. Write these numbers out in words also.	
	Q: How many beads do you think you could hold in your hand? Would you have 100 beads in 10 handfuls?	Number • Page 16

Grade 3 **B2.3**	**Q:** What are two numbers that are greater than 10 but less than 100 that would be easy for you to add in your head? Why is it easy to add them?	Number • Page 32
	Q: What's a smart way to add 49 + 49 in your head?	
	Q: Which estimate makes the most sense to you for 37 + 37: 60 or 70 or 80? Explain why.	
	Q: You add twonumbers and the sum is close to 40, but not quite 40. What might the numbers be?	
	Q: Which expression does not belong? Why? 38 + 99 52 + 48 29 + 19 50 + 50	
	Q: You are asked to create a blog post to explain how to add two-digit numbers using mental strategies. Think about the strategies you would include. Write your blog.	Number • Page 33
	Q: Use a hundred chart. Think of a down arrow as going down one row, an up arrow as going up one row, a right arrow as going right one number, and a left arrow as going left one number. ...	
	Q: List at least three pairs of two-digit numbers for each of the following: a) two-digit numbers that ...	
	Q: I added a number to 35 in my head by adding a little too much and taking some away. What number might I have added?	Number • Page 34
	Q: Is it true that any two two-digit numbers can be added mentally by most people? Explain.	
	Q: Do you think there are more strategies to figure out 62 + 38 mentally or more strategies to figure out 62 − 38 mentally? Explain.	
Grade 4 Open Questions that now align with Grade 5 expectations		
Grade 5 **F1.2**	**Q:** You bought something and paid the clerk $20. You got one bill and eight coins in change. How much money might you have spent? Think of lots of possibilities. Tell what coins you get back.	Number • Page 42
	Q: You pay for something with three bills and five coins. What might the item have cost? Explain your answer.	
	Q: You are counting how much there is if there are four dimes, two $20 bills, five quarters, three nickels, one $5 bill, two loonies, and one $10 bill. In which order would you count the money? Why?	Number • Page 43
	Q: You show an amount of money with coins but no pennies. What do you know for sure about the value when you write the amount of money in dollars and cents?	
Grade 5 **B1.3**	**Q:** Use pattern blocks to show two equal fractions.	Number • Page 23
	Q: Choose three different fractions. Using counting rods, model each fraction in more than one way. Explain why your models are correct each way. Decide whether there is always more than one way to model any fraction. Explain your thinking.	Number • Page 24
	Q: Use a fraction tower to find all the equivalent fractions you can. What do you notice about the denominators of equivalent fractions?	Number • Page 25
	Q: Is it possible for X to be equivalent to X? How?	Number • Page 26

Grade 5 **B1.4**	**Q:** How would you fill in these blanks to make these fractions easy to compare? 4 and 5 . Explain.	Number • Page 23
	Q: One fraction is a lot less than another fraction. What might the two fractions be? How do you know your answer is right?	
	Q: Is there a fraction between X and X? Explain your answer.	
	Q: Create a sentence that includes all of these words and numbers: ...	
	Q: Choose a fraction. Add one to the numerator and one to the denominator. Model this fraction. Is the second fraction greater than, less than, or the same size as the first fraction? Repeat this process with three other fractions. Do you think the change in the size of the fraction depends on the fraction you start with?	Number • Page 24
	Q: Think of some fractions where the numerator of a fraction is three less than the denominator. Which of these could be true? • The fraction is less than ... Explain your thinking.	
	Q: Build the designs described below using blue (rhombus), green (triangle), and red (trapezoid) pattern blocks on top of two yellow (hexagon) pattern blocks. ...	Number • Page 25
	Q: A fraction is just a little less than ó. What might it be? How do you know?	Number • Page 26
	Q: List three fractions with different denominators that are easy to put in order. Explain why it is easy to order them.	
	Q: Name three fractions less than X . How do you know they are less than X?	
	Q: When would X be less than X? Why is that true?	