Vermont Comprehensive Assessment Program (VTCAP)

VERMONT AGENCY OF EDUCATION

Practice Test Alignment Document

Mathematics | Grade 3

Sequence Number	Standard	Learning Target
Session 1		
1	03.OA.04.08 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	Identify the error made when solving a word problem involving repeated addition.
2	03.NF.01.03.d Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	Compare fractions with the same numerator or the same denominator.
3	03.MD.03.07.c Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.	Identify one way to find the area of a rectangle divided into two parts.
4	03.OA.01.01 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*	Represent an equal groups situation using a multiplication equation.
5	03.OA.01.03 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	Solve a multiplication word problem involving equal groups.

Sequence Number	Standard	Learning Target
6	03.G.01.02 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*	Identify why each part of a given shape is not 1/4 of the area of the shape.
7	03.MD.02.03 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*	Select the scaled bar graph that represents a set of data.
8	03.NBT.01.03 Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.	Identify two ways to multiply whole numbers by a multiple of 10.
9*	03.OA.04.08 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	Solve two-step word problems and assess reasonableness using estimation.
10	03.NBT.01.01 Use place value understanding to round whole numbers to the nearest 10 or 100.	Round a three-digit number to the nearest ten.
11	03.OA.04.09 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*	Identify a true statement about the numbers in a pattern with a given starting number and rule.
12	03.NF.01.01 Describe a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.	Identify the fraction of a rectangle that is shaded.

Sequence Number	Standard	Learning Target
13	03.MD.02.04 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.	Measure the lengths of line segments to the nearest quarter inch.
14*	03.NF.01.03.d Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	Identify an error when using models to compare two fractions with the same numerator and correctly compare the two using a symbol.
15	03.MD.03.07.c Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.	Identify equivalent ways to find the area of a rectangle divided into two parts.
16	03.OA.03.07 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	Use the commutative property to multiply two one-digit numbers.
17	03.G.01 Reason with shapes and their attributes.	Identify the attributes that make up two groups of shapes and select the shape that belongs in one of the two groups.
18	03.MD.01.02 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (This excludes compound units such as cm^3 and finding the geometric volume of a container.) Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.	Solve an addition problem involving the mass of two objects by reading the mass of one of the objects on a scale.

Sequence Number	Standard	Learning Target
19	03.NF.01.03.d Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	Identify the fraction that makes an inequality true when comparing fractions with the same numerators or the same denominators.
Session 2		
1	03.OA.02.05 Apply properties of operations as strategies to multiply and divide. (*Examples: commutative property of multiplication, associative property of multiplication, distributive property)*	Use the commutative property to identify the unknown number that makes a multiplication equation true.
2	03.MD.04.08 Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	Find the width of a rectangle when given the perimeter and the length.
3	03.G.01.01 Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.	Determine whether each of three polygons is or is not a quadrilateral.
4	03.NF.01.03.c Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*	Identify the whole number that is at the same point on a number line as 3/3.
5	03.OA.02.05 Apply properties of operations as strategies to multiply and divide. (*Examples: commutative property of multiplication, associative property of multiplication, distributive property)*	Use the associative property of multiplication to identify two equivalent expressions.

Sequence Number	Standard	Learning Target
6	03.MD.03.07.c Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.	Identify an equation that can be solved to find the area of a rectangle divided into two parts.
7	03.MD.04.08 Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	Find the perimeter of a rectangle tiled with square units.
8	03.OA.03.07 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	Multiply two single-digit numbers in context.
9*	03.OA.01.03 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	Write and solve an equation involving a single digit multiplied by a multiple of 10 in context.
10	03.NBT.01.02 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	Identify a strategy that can be used to add two three-digit numbers.
11	03.NF.01.02 Understand a fraction as a number on the number line; represent fractions on a number line diagram.	Identify the fraction represented by a point on a number line.
12	03.NBT.01.03 Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80, 5×60) using strategies based on place value and properties of operations.	Identify the equation involving multiplication of a single digit by a multiple of 10 that is modeled by base ten blocks.

Sequence Number	Standard	Learning Target
13	03.OA.01.02 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*	Identify the expression that represents equal partitioning in a given context.
14*	03.MD.03.07.b Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real-world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.	Solve problems involving areas and perimeters of rectangles.
15	03.NBT.01.01 Use place value understanding to round whole numbers to the nearest 10 or 100.	Round a three-digit number to the nearest ten and plot the answer as a point on a number line.
16	03.NF.01.02.b Represent a fraction *a*/*b* on a number line diagram by marking off *a* lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.	Interpret the potential meaning of a point on a number line in a real-world context.
17	03.OA.04.08 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	Solve a word problem involving multiplication and addition.
18	03.MD.01.01 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	Identify the number line that correctly represents addition of two intervals of time.

*This is a hand-scored question. The scoring rubric can be found at the end of this document for reference.

Scoring Rubrics

Session 1

Question 9

Concepts and Procedures Scoring Rubric

Score	Description
4	The student earns 4 points.
3	The student earns 3 points.
2	The student earns 2 points.
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response.

Concepts and Procedures Training Notes:

Part a

2 points for correct answer, **4** (sheets of stickers), with sufficient explanation to show understanding of solving multi-step word problems

OR

1 point for correct answer with incomplete or no explanation; or for sufficient explanation to show understanding of solving multi-step word problems, with incorrect or no answer

Part b

2 points for correct answer, **2** (packs of stickers), with sufficient explanation to show understanding of solving multi-step word problems

OR

1 point for correct answer with incomplete or no explanation; or for sufficient explanation to show understanding of solving multi-step word problems, with incorrect or no answer

Mathematical Practices Scoring Rubric

Score	Description
2	The student earns 2 points.
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response.

Scoring Rubrics

Mathematical Practices Training Notes:

1 point for making sense of problems (does not show evidence of using any of the extraneous information)

1 point for ensuring the solution makes sense (compares the estimated amounts to the actual amounts)

Exemplary Response:

a. 4 sheets of stickers; $3 \times 8 = 24$, $24 \div 6 = 4$

b. 2 more packs of stickers; He will need 4 sheets of stickers for each of the 4 bags $4 \times 4 = 16$. He will need 16 sheets of stickers in all. There are 8 sheets of stickers in each pack. $16 \div 8 = 2$. So he will need to buy 2 more packs of stickers.

c. No, he is not correct. $25 + 15 = 40$, $18 > 15$, so $25 + 18 > 40$. Wyatt spent more than $40 on the cake and balloons.

OR

$25 + 18 = 43$, $43 > 40$ So Wyatt is not correct.

Scoring Rubrics

Session 1
Question 14

Concepts and Procedures Scoring Rubric

Score	Description
2	The student earns 2 points.
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response.

Concepts and Procedures Training Notes:

Part b

2 points for correct number sentence, $\frac{2}{3} > \frac{2}{5}$, or equivalent with sufficient explanation to show understanding of comparing fractions with the same numerator by reasoning about their size

OR

1 point for correct number sentence with insufficient or no explanation; or for sufficient explanation to show understanding of comparing fractions with the same numerator by reasoning about their size with incorrect or no number sentence

Mathematical Practices Scoring Rubric

Score	Description
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response.

Mathematical Practices Training Notes:

1 point for constructing an argument (sufficient explanation of how fractions can be compared only when they refer to the same whole)

Exemplary Response:

a. Mason cannot use the models because they are not the same size. They do not show the same whole.

b. $\frac{2}{3} > \frac{2}{5}$

The numerators are the same, so I compared the denominators. 3 < 5.

A smaller denominator means each part of the whole is greater. So, $\frac{2}{3} > \frac{2}{5}$.

Scoring Rubrics

Session 2

Question 9

Concepts and Procedures Scoring Rubric

Score	Description
2	The student earns 2 points.
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response.

Concepts and Procedures Training Notes:

Part a

1 point for correctly relating 150 as the product and 30 as one of the factors in the equation

Part b

1 point for the correct answer, **5** (fish tanks)

Mathematical Practices Scoring Rubric

Score	Description
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response.

Mathematical Practices Training Notes:

1 point for abstracting a given situation (using a symbol or letter to represent the unknown factor in the equation for part [a])

Exemplary Response:

a. 30 x ☐ = 150

b. There are 5 fish tanks.

Scoring Rubrics

Session 2

Question 14

Concepts and Procedures Scoring Rubric

Score	Description
4	The student earns 6 points.
3	The student earns 4 or 5 points.
2	The student earns 2 or 3 points.
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response.

Concepts and Procedures Training Notes:

Part a

2 points for correct answer, **8 (square feet)** with sufficient work or explanation to show understanding of finding the area of a rectangular figure

OR

1 point for correct answer with insufficient or no explanation; or for sufficient explanation to show understanding of finding the area of a rectangular figure, with incorrect or no answer

Part b

2 points for correct answer, **24 (square feet)** with sufficient work or explanation to show understanding of finding the total area of two rectangular figures

OR

1 point for correct answer with insufficient or no explanation; or for sufficient explanation to show understanding of finding the total area of two rectangular figures, with incorrect or no answer

Part c

2 points for correct answer, **18 (feet)** with sufficient work or explanation to show understanding of finding the perimeter of a rectangular figure

OR

1 point for correct answer with insufficient or no explanation; or for sufficient explanation to show understanding of finding the perimeter of a rectangular figure, with incorrect or no answer

Scoring Rubrics

Mathematical Practices Scoring Rubric

Score	Description
2	The student earns 2 points.
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response.

Mathematical Practices Training Notes:

1 point for abstracting a given situation (uses the appropriate measurements for each part of the problem)

1 point for using quantitative reasoning (correctly computes the areas and perimeter for the problem)

Exemplary Response:

a. 8 (square feet) $2 \times 4 = 8$

b. 24 (square feet) $3 \times 4 = 12$, $12 + 12 = 24$

c. 18 (feet) $4 + 4 + 5 + 5 = 18$