New York State Assessment Mathematics

Lessons and Activities

Grade 4

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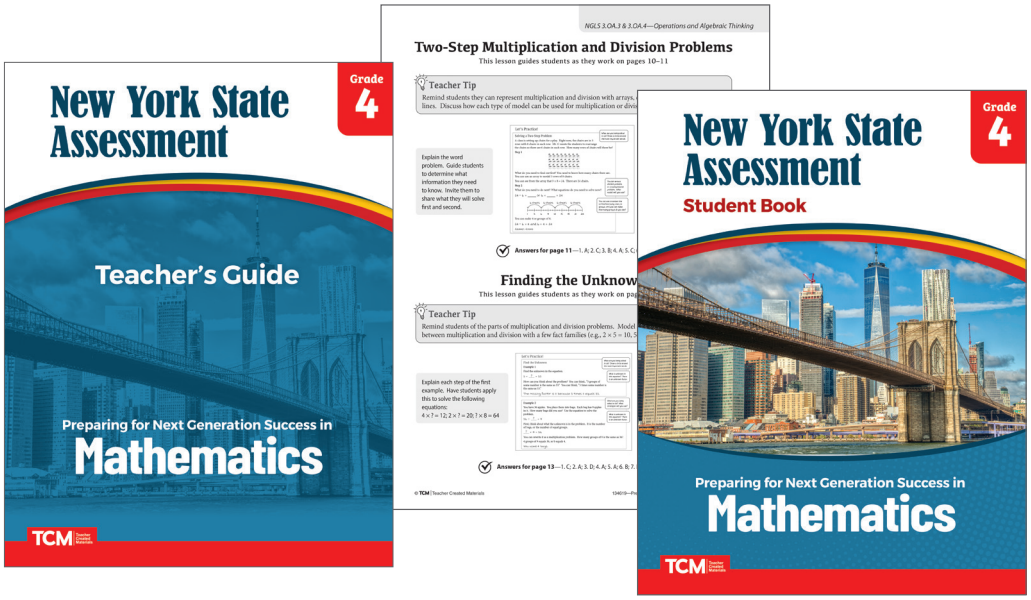

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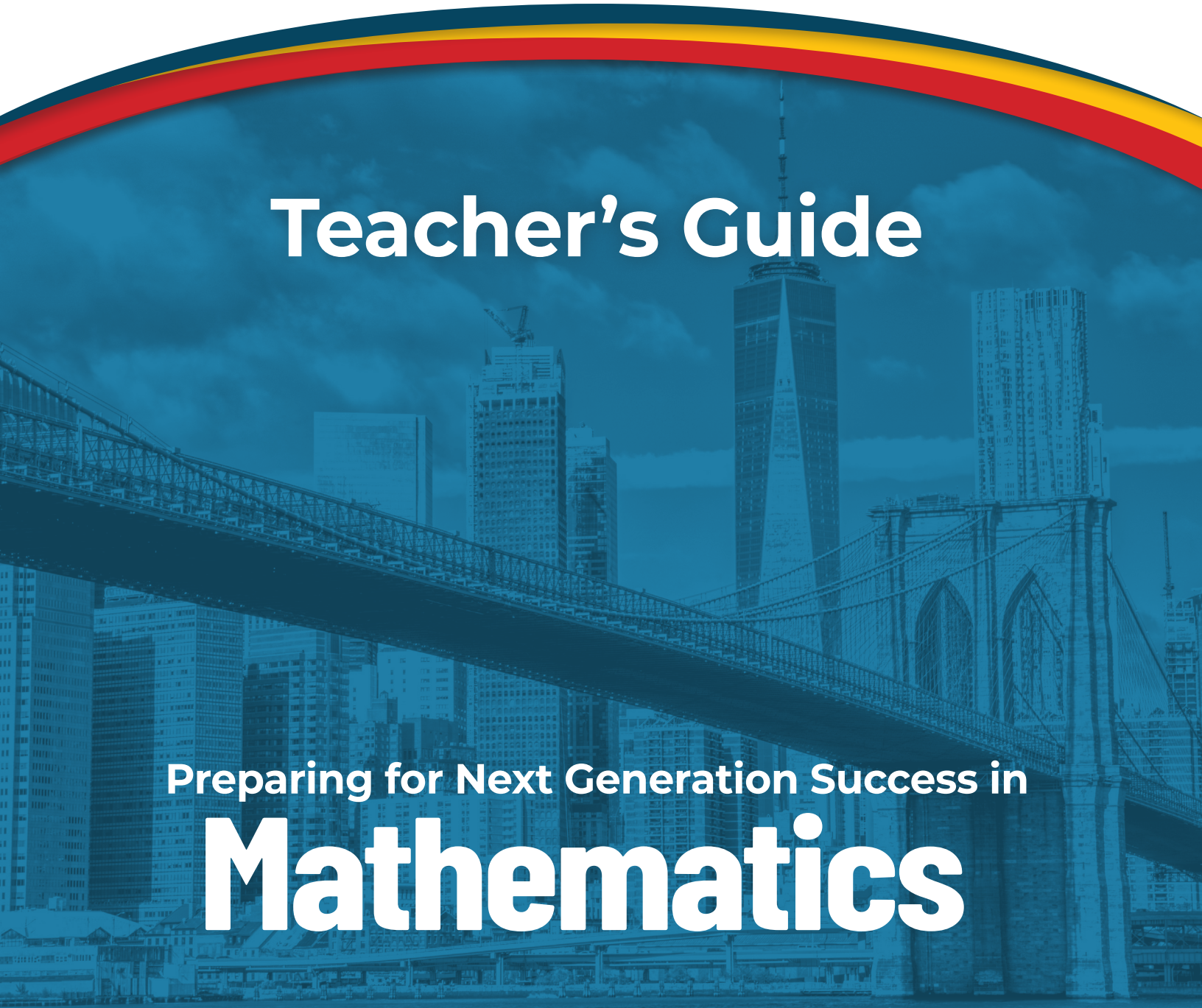

Teacher's Guide

Preparing for Next Generation Success in

Mathematics

TCM Teacher Created Materials

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Pacing Plan

The following eight-week pacing plan is designed to provide students with standards-based mathematics practice every day. Lessons in the student book appear in this order. You should customize this pacing plan according to students' needs. Prepare your students in only 30 minutes a day.

	Day 1	Day 2	Day 3	Day 4	Day 5
Operations	Multiplication Equations (4.OA.1)	Solving Real-World Problems (4.OA.2)	Writing Equations with Variables (4.OA.3a)	Solving Multistep Problems (4.OA.3a)	Does It Make Sense? (4.OA.3b)
Algebraic Thinking	Finding All Factor Pairs & Relationship Between a Multiple and a Factor (4.OA.4)	Finding Multiples (4.OA.4)	Prime or Composite? (4.OA.4)	Find the Rule (4.OA.5)	Place Value (4.NBT.1)
Base Ten and Fractions	Writing Numbers in Expanded Form (4.NBT.2a) Ordering and Comparing Numbers (4.NBT.2b)	Rounding Numbers (4.NBT.3)	Multiplying (4.NBT.5) Dividing (4.NBT.6)	Equal Fractions (4.NF.1)	Comparing and Ordering Fractions (4.NF.2)
Fractions	Adding and Subtracting Fractions (4.NF.3a/d)	Decomposing Fractions (4.NF.3b)	Adding and Subtracting Mixed Numbers (4.NF.3c)	Multiplying Whole Numbers by Fractions (4.NF.4a–c)	Adding Fractions Using Place Value (4.NF.5)
Decimals and Measurement	Writing Fractions as Decimals (4.NF.6)	Comparing Decimals (4.NF.7)	Choosing Relative Sizes (4.MD.1)	Converting Units & More Converting (4.MD.1)	Measurement Problems (4.MD.2a)
Measurement	Measuring with Diagrams (4.MD.2b)	Rectangles (4.MD.3)	Lots of Plots (4.MD.4)	Angles in Circles (4.MD.5a)	Finding Angle Measures (4.MD.5b)
Geometry	Using a Protractor (4.MD.6)	Missing Measures (4.MD.7)	Identifying Figures (4.G.1)	Triangles! (4.G.2a) Parallelograms (4.G.2b) Quadrilaterals (4.G.2c)	Symmetry (4.G.3)
Practice Tests	Test 1	Test 1 Review	Test 2	Test 2 Review	Celebration

Multiplication Equations

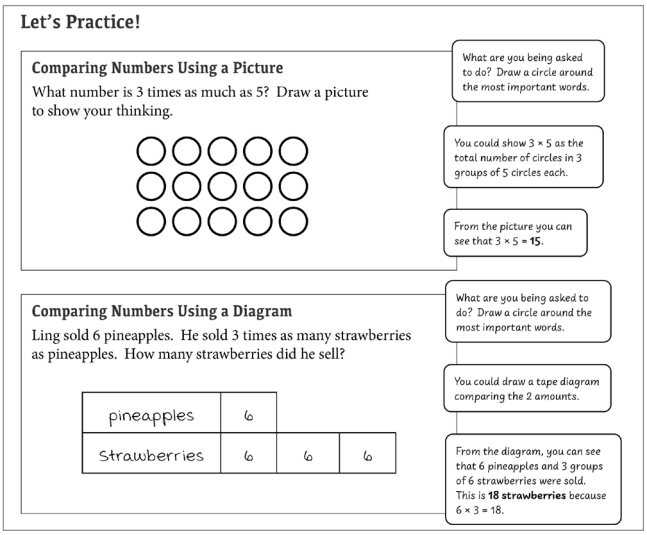
This lesson guides students as they work on pages 6–7.

Teacher Tip

Remind students that multiplication is a grouping of numbers. The answer to a multiplication problem is called a product.

Explain each step in the first example. Next, have students draw their own pictures of a number 4 times as much as 6. Remind them they can use whatever pictures they would like. Discuss why $4 \times 6 = 24$.

Discuss the diagrams and stress the importance of each section of the diagram being equal size. Next, have students draw tape diagrams to solve this problem to reinforce the idea. Lee has 8 bananas. Marchand has 3 times as many bananas. How many bananas does Marchand have? From their diagrams, students should realize $3 \times 8 = 24$.



Let's Practice!

Comparing Numbers Using a Picture

What number is 3 times as much as 5? Draw a picture to show your thinking.

What are you being asked to do? Draw a circle around the most important words.

You could show 3 × 5 as the total number of circles in 3 groups of 5 circles each.

From the picture you can see that 3 × 5 = **15**.

Comparing Numbers Using a Diagram

Ling sold 6 pineapples. He sold 3 times as many strawberries as pineapples. How many strawberries did he sell?

pineapples	6		
Strawberries	6	6	6

What are you being asked to do? Draw a circle around the most important words.

You could draw a tape diagram comparing the 2 amounts.

From the diagram, you can see that 6 pineapples and 3 groups of 6 strawberries were sold. This is **18 strawberries** because 6 × 3 = 18.

Answers for page 7—1. C; 2. C; 3. D; 4. D; 5. A; 6. B; 7. A; 8. B

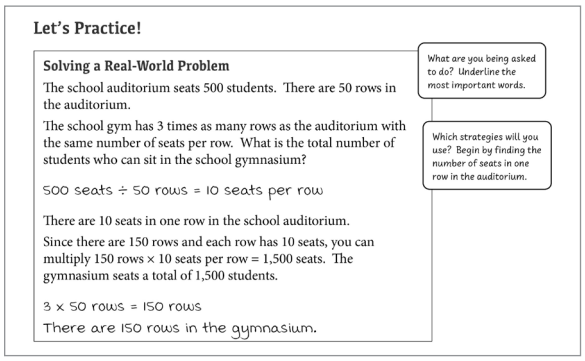
Solving Real-World Problems

This lesson guides students as they work on pages 8–9.

Teacher Tip

Remind students that products get larger when multiplying and quotients get smaller when dividing.

Have students explain their thinking, step-by-step. Reinforce that often we must complete multiple steps before we find the answer to a problem.



Let's Practice!

Solving a Real-World Problem

The school auditorium seats 500 students. There are 50 rows in the auditorium.

The school gym has 3 times as many rows as the auditorium with the same number of seats per row. What is the total number of students who can sit in the school gymnasium?

500 seats ÷ 50 rows = 10 seats per row

There are 10 seats in one row in the school auditorium.

Since there are 150 rows and each row has 10 seats, you can multiply 150 rows × 10 seats per row = 1,500 seats. The gymnasium seats a total of 1,500 students.

3 × 50 rows = 150 rows

There are 150 rows in the gymnasium.

What are you being asked to do? Underline the most important words.

Which strategies will you use? Begin by finding the number of seats in one row in the auditorium.

Invite students to turn and talk with partners to identify how they know there is more work to be done.

Answers for page 9—1. C; 2. C; 3. D; 4. A; 5. D; 6. D

Performance Level Description Correlations

Each lesson strategy corresponds with a Performance Level Description (PLD) as outlined by the NYSED. The strategies in each lesson are written to align with the highest PLD for each standard.

Lesson Title	Standard	Performance Level Description
Multiplication Equations	4.OA.1	Interpret multiplication equations as comparisons and represent verbal statements of multiplicative comparisons as multiplication equations.
Solving Real-World Problems	4.OA.2	Use multiplication or division to solve multistep word problems involving multiplicative comparisons or create real-world problems that can be solved using multiplicative comparison.
Writing Equations with Variables	4.OA.3a	Represent multistep word problems using equations or expressions with a letter representing the unknown quantity.
Solving Multistep Problems	4.OA.3a	Solve multistep word problems using any of the four operations with whole numbers and having whole-number answers, including problems in which remainders must be interpreted.
Does It Make Sense?	4.OA.3b	Solve multistep word problems using any of the four operations with whole numbers and assess the reasonableness of answers using mental computation and estimation strategies, including rounding by providing a valid mathematical explanation.
Finding All Factor Pairs	4.OA.4	Find all factor pairs for a whole number in the range 1–100.
Relationship Between a Multiple and a Factor	4.OA.4	Explain the relationship between a multiple and a factor of a given whole number.
Finding Multiples	4.OA.4	Explain how you know a given whole number is a multiple of a given one-digit number.
Prime or Composite?	4.OA.4	Explain why a given whole number is prime or composite.
Find the Rule	4.OA.5	Given a pattern that follows an arithmetic rule, generate a different pattern using the same rule, identify the rule, and explain the apparent features of the pattern that are not explicit in the rule itself.
Place Value	4.NBT.1	Explain the relationship between place value and multiplication or division.
Writing Numbers in Expanded Form	4.NBT.2a	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form.

Performance Level Description Correlations *(cont.)*

Lesson Title	Standard	Performance Level Description
Ordering and Comparing Numbers	4.NBT.2b	Compare or order three or more multi-digit numbers based on meanings of the digits in each place, using >, =, < symbols to record the results of the comparison and explain the reasons for doing so.
Rounding Numbers	4.NBT.3	Given a context, choose an appropriate rounded number.
Multiplying	4.NBT.5	Multiply a multi-digit whole number by a one- or two-digit whole number using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. Explore connection of strategy to a standard algorithm.
Dividing	4.NBT.6	Divide a multi-digit whole number by a one-digit divisor to find a quotient with or without a remainder, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, area models, or other strategies. Explore connection of strategy to a standard algorithm.
Equal Fractions	4.NF.1	Recognize and generate equivalent fractions with denominators that may exceed the level 3 limitations with attention to how the number and size of the parts differ, even though the two fractions themselves are the same size. Recognize that a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{a \times n}{b \times n}$ based on multiplying the numerator and denominator by n, and that it gives the same result as partitioning each unit fraction piece into n smaller equal pieces.
Comparing and Ordering Fractions	4.NF.2	Compare or order more than two fractions with different numerators and different denominators. Recognize that comparisons are valid only when the fractions refer to the same whole. Record the results of comparisons with symbols >, =, or < and justify the conclusions.
Adding and Subtracting Fractions	4.NF.3a/d	Create, solve, and explain mathematical and word problems involving the addition and subtraction of fractions with like denominators (including mixed numbers) that refer to the same whole.

Performance Level Description Correlations *(cont.)*

Lesson Title	Standard	Performance Level Description
Decomposing Fractions	4.NF.3b	Decompose a fraction (including mixed numbers) into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions.
Adding and Subtracting Mixed Numbers	4.NF.3c	Add and subtract mixed numbers with like denominators using properties of operations and the relationship between addition and subtraction.
Multiplying Whole Numbers by Fractions	4.NF.4a–c	Solve mathematical and word problems involving multiplication of a whole number by a fraction and justify more than one solution path.
Adding Fractions Using Place Value	4.NF.5	Explain the place value relationship among equivalent fractions with denominators of 10 and 100, and then add them.
Writing Decimals as Fractions	4.NF.6	Use decimal notation for fractions with denominators of 10 or 100 to recognize an equivalent decimal on a number line or recognize the number line that represents a given decimal.
Comparing Decimals	4.NF.7	Compare more than two decimals in tenths and hundredths by reasoning about their size. Recognize that comparisons are only valid when the decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusion.
Choosing Relative Sizes	4.MD.1	Apply relative sizes of measurement to real-world contexts: ft, in, km, m, cm.
Converting Units	4.MD.1	Know the conversion factor and use it to convert a smaller unit in terms of a larger unit: ft, in; km, m, cm; min, sec.
More Converting	4.MD.1	Convert all other measurements within a single system of measurement from a larger unit to a smaller unit. e.g., Convert kilograms to grams, pounds to ounces, or liters to milliliters; record measurement equivalents in a two-column table; generate a conversion table for feet and inches.
Measurement Problems	4.MD.2a	Use the four operations to solve multistep word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, and involving whole numbers, fractions or decimals, or problems that require expressing measurements given in a larger unit in terms of a smaller unit.

Performance Level Description Correlations *(cont.)*

Lesson Title	Standard	Performance Level Description
Measuring with Diagrams	4.MD.2b	Represent measurement quantities using diagrams that feature a measurement scale, such as number lines, and involving any of the four operations.
Rectangles	4.MD.3	Solve mathematical or real-world problems involving rectangles with the same area but different perimeters, or same perimeters but different areas.
Lots of Plots	4.MD.4	For a given data set and its plot, analyze the data by writing questions that will help describe how the data is distributed over the given range.
Finding Angle Measures	4.MD.5b	Recognize that an angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.
Angles in Circles	4.MD.5a	Use the concept of angle measure to identify and analyze angles in geometric shapes or real-world objects based on how the functionality or structure is relevant to the geometric shape or object itself.
Using a Protractor	4.MD.6	Given an angle measure in whole-number degrees, use a protractor to identify the diagram with the same measure or sketch the angle of the specified measure.
Missing Measures	4.MD.7	Decompose a given angle and generate an addition and/or subtraction problem that models the decomposition. Create and solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems.
Identifying Figures	4.G.1	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines; identify these in two-dimensional figures.
Triangles!	4.G.2a	Classify triangles based on angle size.
Parallelograms	4.G.2b	Classify quadrilaterals with exactly 2 pairs of parallel sides as parallelograms based on the presence or absence of parallel sides.
Quadrilaterals	4.G.2c	Classify quadrilaterals based on the presence or absence of right angles.
Symmetry	4.G.3	Explain what it means for a figure to be symmetrical using examples of symmetrical and non-symmetrical figures.

Grade 4

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Student Book

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Multiplication Equations

Lesson Focus

I can explain and write multiplication equations as comparisons.

1. What are we focusing on in today's lesson?

_____

2. What does the word *comparison* mean?

_____

_____

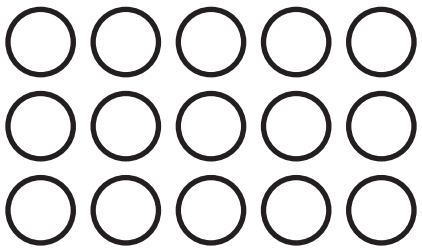
What You Need to Know

There are different ways you can compare numbers. You can use words, pictures, diagrams, or multiplication. It is important to remember that multiplication means you find the products of groups of numbers.

Let's Practice!

Comparing Numbers Using a Picture

What number is 3 times as much as 5? Draw a picture to show your thinking.



What are you being asked to do? Draw a circle around the most important words.

You could show 3 × 5 as the total number of circles in 3 groups of 5 circles each.

From the picture you can see that 3 × 5 = **15**.

Comparing Numbers Using a Diagram

Ling sold 6 pineapples. He sold 3 times as many strawberries as pineapples. How many strawberries did he sell?

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You could draw a tape diagram comparing the 2 amounts.

From the diagram, you can see that 6 pineapples and 3 groups of 6 strawberries were sold. This is **18 strawberries** because 6 × 3 = 18.

Independent Practice

Directions: Read each question carefully and think about the answer before making your choice.

1 What number is 8 times as much as 4?

A 23

B 84

C 32

D 34

2 Use a tape diagram to show what number is 3 times as many as 7.

A

7	7	7	7	7	7	7
7	7	7				

B

3	3	3
3		

C

7	7	7
7		

D

3	3	3	3	3
3	3			

3 How much is 5 times as much as 7?

A 12

B 15

C 57

D 35

4 Which question can be answered using the multiplication problem 10×3?

A What is the sum of 10 and 3?

B What is the difference between 10 and 3?

C How many times does 3 go into 10?

D How much is 10 times as much as 3?

5 Which question can be answered using the multiplication problem 4×5?

A How much is 5 times as much as 4?

B What is the quotient of 4 and 5?

C What is difference between 5 and 4?

D What is the sum of 4 and 5?

6 Which tape diagram shows what number is 4 times as many as 8?

A

4	4	4	4
4			

B

8	8	8	8
8			

C

4	4
4	

D

8	8	8	8	8	8	8	8
8	8						

7 What number is 6 times as much as 9?

A 54

B 15

C 45

D 69

8 What number is 9 times as much as 20?

A 18

B 180

C 29

D 110

Solving Real-World Problems

Lesson Focus

I can use multiplication or division to solve real-world problems.

1. Which details help you understand this objective?

_____

2. What are *real-world problems* in math?

_____

_____

What You Need to Know

Division is splitting up an amount into equal parts. Multiplication is finding the product of groups of numbers, or factors. Sometimes, you need to do many steps to find the answer to a problem.

Let's Practice!

Solving a Real-World Problem

The school auditorium seats 500 students. There are 50 rows in the auditorium.

The school gym has 3 times as many rows as the auditorium with the same number of seats per row. What is the total number of students who can sit in the school gymnasium?

What are you being asked to do? Underline the most important words.

Which strategies will you use? Begin by finding the number of seats in one row in the auditorium.

500 seats ÷ 50 rows = 10 seats per row

There are 10 seats in one row in the school auditorium.

Since there are 150 rows and each row has 10 seats, you can multiply 150 rows × 10 seats per row = 1,500 seats. The gymnasium seats a total of 1,500 students.

3 x 50 rows = 150 rows

There are 150 rows in the gymnasium.

Independent Practice

Directions: Read each question carefully and think about the answer before making your choice.

1 Angelo's grandmother has 84 flowers. She wants to put them into vases of 12 flowers each. How many vases will she need?

A 96

B 12

C 7

D 9

2 Rico's mom has 2 times as many flowers as Angelo's grandmother from problem number 1. How many flowers does Rico's mom have?

A 192

B 180

C 168

D 150

3 Johanna can fit 2 people in her car. Myka's car fits 3 times as many people as Johanna's car. Shin's car fits 3 fewer people than Myka's car. What is the total number of people all 3 cars can fit?

A 8

B 9

C 10

D 11

4 Mickey has 30 baseball cards. Rhonda has 4 times as many cards as Mickey. Fiona has 10 fewer cards than Mickey. How many baseball cards do they have in all?

A 170

B 120

C 140

D 20

5 Wendy needs 25 cookies so each student in her class receives 1 cookie. Darnell's class needs 5 fewer cookies. Giada's class needs 2 times as many cookies as Darnell's class. How many cookies do they need in all?

A 95

B 75

C 105

D 85

6 There are 24 students in Mrs. Reid's class. She has 2 times as many pencils as there are students in her class. How many pencils does Mrs. Reid have?

A 24

B 28

C 50

D 48