

GRADE 4

Empire State Mathematics

March to March



**Sample
Lesson**

Continental Press

Table of Contents

Introduction	5
UNIT 1 Number Systems and Theory	7
4.N.1, 2, 4, 5 Lesson 1 Place Value	8
4.N.3 Lesson 2 Comparing and Ordering Whole Numbers	12
3.N.14, 15 Lesson 3 Fractions	16
4.N.6 Lesson 4 Associative Property	20
4.N.13 Lesson 5 Odd and Even Numbers	24
Number Systems and Theory Review	28
UNIT 2 Operations	31
4.N.14, 15 Lesson 1 Adding and Subtracting Whole Numbers	32
3.N.19, 20; 4.N.15, 16 Lesson 2 Multiplication Facts	36
3.N.22, 23; 4.N.15, 16 Lesson 3 Division Facts	40
4.N.20 Lesson 4 Multiples of 10 and 100	44
4.N.18 Lesson 5 Multiplying Two-Digit Numbers	48
4.N.21, 22 Lesson 6 Dividing Two-Digit Numbers	52
Operations Review	56
UNIT 3 Estimation	59
3.N.25, 26 Lesson 1 Using Estimation	60
4.N.26 Lesson 2 Rounding	64
4.N.27 Lesson 3 Using Estimation to Determine Reasonableness	68
Estimation Review	72
UNIT 4 Algebra	75
4.A.1 Lesson 1 Open Sentences	76
3.A.1; 4.A.2 Lesson 2 Using the Symbols $<$, $>$, and $=$	80
4.A.3 Lesson 3 Equations and Inequalities	84
4.A.4 Lesson 4 Number Patterns	88
4.A.4 Lesson 5 Geometric Patterns	92
4.A.5 Lesson 6 Functions	96
Algebra Review	100

UNIT 5 Geometry			103
4.G.1, 2	Lesson 1	Polygons	104
3.G.2	Lesson 2	Congruent and Similar Figures	108
4.G.3	Lesson 3	Perimeter	112
4.G.4	Lesson 4	Area	116
4.G.5	Lesson 5	Three-Dimensional Figures	120
		Geometry Review	124
UNIT 6 Measurement			127
4.M.1, 4, 6	Lesson 1	Selecting Tools and Units	128
4.M.2	Lesson 2	Customary Units of Length	132
4.M.2	Lesson 3	Metric Units of Length	136
4.M.3	Lesson 4	Equivalent Units of Length	140
4.M.5	Lesson 5	Metric Units of Mass	144
4.M.7	Lesson 6	Metric Units of Capacity	148
		Measurement Review	152
UNIT 7 Time and Money			155
4.M.8	Lesson 1	Making Change	156
4.M.9	Lesson 2	Elapsed Time: Clocks	160
4.M.10	Lesson 3	Elapsed Time: Calendars	164
		Time and Money Review	168
UNIT 8 Statistics			171
3.S.1	Lesson 1	Formulating Questions	172
3.S.2; 4.S.3	Lesson 2	Data and Tables	176
4.S.3	Lesson 3	Bar Graphs and Pictographs	180
4.S.5, 6	Lesson 4	Conclusions and Predictions	184
		Statistics Review	188

Multiplication Facts

Indicators 3.N.19, 20; 4.N.15, 16

multiply

factor

product

array

commutative property

multiplication table

times table



Multiply to combine groups of equal size. Multiplying is the same as adding a number to itself several times.

Shanna has 4 coin purses. Each coin purse has 6 coins. How many coins does Shanna have?



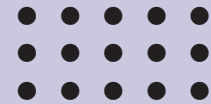
1. Identify the factors and write a multiplication sentence: 4×6 .
2. One way to multiply is to change 4×6 to an addition sentence, and add: $4 \times 6 = 6 + 6 + 6 + 6 = 24$. Four groups of 6 equals 24. Shanna has 24 coins.



6 ← **Factor**
 $\times 4$ ← **Factor**
 24 ← **Product**



An **array** or other model can show multiplication.



3 rows of 5 = $3 \times 5 = 15$

You should memorize the **multiplication table**, or **times table**, to learn all the basic multiplication facts up to $12 \times 12 = 144$.

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144



The **commutative property** can help you remember the times table. When you know that $3 \times 9 = 27$, you also know that $9 \times 3 = 27$.



When you multiply any number by 1, the product is the number.

$$7 \times 1 = 7 \quad 1 \times 7 = 7$$



When you multiply any number by 0, the product is 0.

$$6 \times 0 = 0 \quad 0 \times 6 = 0$$



GUIDED PRACTICE

Try this sample multiple-choice problem.

- S** Which number sentence can be solved to find the number of dots in this array?



- A** $3 + 5 = \square$ **C** $3 \times 5 = \square$
B $3 + 6 = \square$ **D** $3 \times 6 = \square$



This problem asks you to find the multiplication problem that matches an array of dots. The array has 3 rows, and each row has 6 dots. The multiplication problem is $3 \times 6 = \square$. The correct answer is D.



INDEPENDENT PRACTICE

Read each problem. Circle the letter of the best answer.

- 1** What number goes in the box to make this number sentence true?

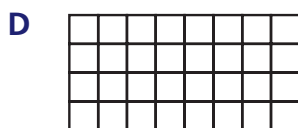
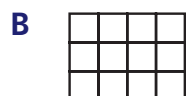
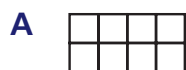
$$7 \times 6 = \square$$

- A** 13
B 42
C 48
D 49

- 2** One week has 7 days. How many days are there in 10 weeks?

- A** 17 **C** 70
B 24 **D** 77

- 3** Which area model shows the multiplication fact $2 \times 4 = 8$?



- 4** What is the value of 6×12 ?

- A** 18
B 24
C 66
D 72

- 5** Which of these expressions is equivalent to 3×9 ?

- A** $3 + 3 + 3$
B $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$
C $9 + 9 + 9$
D $9 \times 9 \times 9$

- 6** Markus bought 8 packages of gum. Each package has 12 sticks of gum. How many sticks of gum did Markus buy altogether?

- A** 86
B 88
C 96
D 98



GUIDED PRACTICE

Try this sample constructed response problem.

S Look at this multiplication expression.

$$4 \times 7$$

Part A: Write an addition expression that is equivalent to 4×7 .

Answer: 7 + 7 + 7 + 7

Part B: Write a different addition expression that is equivalent to 4×7 .

Answer: 4 + 4 + 4 + 4 + 4 + 4 + 4



This problem asks you to write two different addition expressions that are equivalent to 4×7 . Multiplying 4 times 7 is the same as adding 7 to itself 4 times, so one addition expression is $7 + 7 + 7 + 7$. But 4×7 is also the same as adding 4 to itself 7 times, so another addition expression is $4 + 4 + 4 + 4 + 4 + 4 + 4$.



INDEPENDENT PRACTICE

Read the problem. Write your answers.

7 Look at this number sentence.

$$7 \times \square = 84$$

What number goes in the box to make the number sentence true?

Answer: _____

Explain how you found your answer.



Read the problem. Write your answers.

8 Devin walked his dog 12 kilometers each day for 5 days.

Part A: How far did Devin walk his dog in all?



Use a basic multiplication fact to help you solve this problem.

Answer: _____

Explain how you found your answer.

Part B: Draw an array to model the multiplication fact you used in part A.