Grade 3

Multiplication Shortcuts

Multiplication Unit

Identifying Patterns

CCSS Aligned
Lesson Plans
and
Math Exploration

Math Workshop

The Owl TEACHER

Standards Addressed

3.NBT.A.3
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.

3.OA.A.4
Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?*

3.OA.B.5
Apply properties of operations as strategies to multiply and divide.[2] *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)*

3.OA.C.7
Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

3.OA.D.9
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.*

**The distributive property is taught again in the Area Unit.
**Partitioning is taught during the Fraction Unit and again during the Area Unit.
**Other multiplication standards can be found in the Multiplication and Division Unit.

SOURCE:
National Governors Association Center for Best Practices & Council of Chief State School Officers. (2010). *Common Core State Standards for Mathematics*. Washington, DC: Authors.

Unit Overview

Lesson 1 What is a multiple? What patterns are on a multiplication chart? pg. 12	**Lesson 2** What patterns can I find within a hundred chart? pg. 23	**Lesson 3** What patterns & shortcuts can I learn with the factors of 5 and 10? pg. 31	**Lesson 4** What patterns & shortcuts can I learn with the factors of 2, 4, and 8? pg. 40	**Lesson 5** What patterns & shortcuts can I learn with the factors of 3 and 6? pg. 45
Lesson 6 What patterns & shortcuts can I learn with the factor of 9? pg. 52	**Lesson 7** What patterns and shortcuts can I learn with the factor of 7? pg. 57	**Lesson 8** How does understanding the properties of multiplication help me? pg. 61	**Lesson 9** How does understanding the distributive property help me? pg. 69	**Lesson 10** Shortcuts review pg.
Lesson 11 How do I multiply by multiples of ten? pg. 84	**Lesson 12** How do I find multiples of ten? pg. 91	**Lesson 13** What patterns can I discover related to multiplying by multiples of ten? pg. 95	**Lesson 14** How do I multiply with missing numbers? pg. 101	**Lesson 15** Review pg. 105

Pretest pg. 10

Post test pg. 109

Vocabulary Covered

Multiple
Multiply
Product
Factors
Pattern

Zero Property of Multiplication
Identify Property of Multiplication
Associative Property of Multiplication
Communitive Property of Multiplication

Multiplication shortcuts

2 → Double

3 → Double, then add one group

4 → Double, double

5 → Skip count by 5

6 → Multiply by 5, add one group

7 → Multiply by 5, then double

8 → Double, double, and double!

9 → Multiply by 10, subtract one group

10 → Write the factor, add a zero

Lesson 7: What patterns and shortcuts can I learn with the factors of 7?

I Can Statement
I can describe patterns with the factors of 7. I can use shortcuts to help learn my multiplication facts.

CCSS
3.OA.9
3.OA.7

Vocabulary
none new

Warm Up

Give students one of the addition problems and one of the subtraction problems provided on the cards in the beginning of the unit. Check the answers together. This should be brief and a review. These should be solved mentally using strategies if possible. Have students share how they arrived at the answer.

Mini-lesson
Materials: "Multiplication Shortcuts" Anchor Chart (I add to it each day)

Boys and girls, we are almost done with the shortcuts! I am amazed at how well you have been doing at learning these! These shortcuts will definitely pay off. Today, we are going to talk about the number seven! The number seven has a shortcut that can be a bit tricky but I know you can learn it! The shortcut for seven is to first take the other factor and multiply it by 5. Then you will take that same factor and double it. You will take both answers and add them together. Let me show you with an example. Let's say the problem is 7x4. First, I'm going to multiply 4x5 and get 20. Then I'm going to double 4 and get 8. Then lastly, I'm going to add 20+8 to get the answer of 28. (Demonstrate with a few more examples using a think aloud for all three steps so students can understand the shortcut.)

Active Engagement
Materials: None

I want you to give it a try! I want you to try with these problems here. (Write on your chart paper or board a few different problems and remind students to use the shortcuts learned during this lesson. Check as students are working on it to verify that they are trying the strategy. Take note of any students who may need additional assistance. When everyone is done, check the answers together.)

Link and Independent Practice
Materials: "Multiplication Shortcuts" Sheets; Die

Today, we are going to continue practicing this shortcut. I'm going to have you partner up and play a quick game. In this game, you will place your token on start and roll a die. The die will determine how many spaces you move forward. You will multiply the number on the box that you land on by 7, using the shortcut. Then your partner will check your answer. If you have it correct, you will write the product down as your points, but if you have it wrong, your turn is over and you get no points. You will alternate turns adding your points up until each person gets to the finish. Once each person gets to the finish, you will add up all your points and see who has the most. That person will have won that game. Once you are finished playing the game, I have a practice sheet for you to work on independently. Let's get started!

Intervention
Provide students with an index card where the steps are written out for them. Help walk them through each step individually. Use base ten blocks if necessarily for regrouping.

Extension
Have students explain why they first skip count then complete a double in this shortcut. Have them test this shortcut with larger numbers.

Closing
Materials: Sticky Note

Have students write on a sticky-note the three steps to the multiplication shortcut of the factor 7. Collect it, or go over it together.

Multiplication 5's Shortcuts

Name _____

RULE: Skip count.

Using the shortcuts that you learned, solve the problems below. Write the answer on the line.

1.) Skip count first. 5 x 8 = ____, ____, ____, ____, ____, ____, ____, ____. The answer of 5 x 8 is ____.

2.) Skip count first. 6 x 5 = ____, ____, ____, ____, ____, ____. The answer of 6 x 5 is ____.

3.) Skip count first. 3 x 5 = ____, ____, ____. The answer of 3 x 5 is ____.

4.) Skip count first. 5 x 9 = ____, ____, ____, ____, ____, ____, ____, ____, ____. The answer of 5 x 9 is ____.

5.) Skip count first. 5 x 5 = ____, ____, ____, ____, ____. The answer of 5 x 5 is ____.

Solve the following problems, but remember to skip count! Write the answer on the line.

6.) 5 x 10 = ____

7.) 5 x 2 = ____

8.) 6 x 5 = ____

10.) 3 x 5 = ____

11.) 5 x 5 = ____

12.) 7 x 5 = ____

13.) 2 x 5 = ____

14.) 5 x 6 = ____

15.) 5 x 8 = ____

16.) 5 x 3 = ____

17.) 5 x 7 = ____

18.) 9 x 5 = ____

19.) 5 x 4 = ____

20.) 10 x 5 = ____

BONUS Skip count to find: 15 x 5 = _____

Multiplication 7's Shortcuts

Name _____

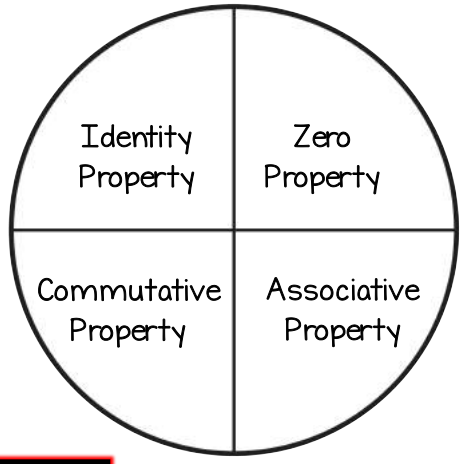
RULE: 7 - multiply the factor by 5, then double the factor. Finally, add those two products.

Using the shortcuts that you learned, solve the problems below. Then find the matching fish and glue it in the appropriate fish bowl.

7 x 4	7 x 6	6 x 7	7 x 7
8 x 7	7 x 2	3 x 7	7 x 11
7 x 10	7 x 5	7 x 12	7 x 1

7	42	28	77
70	14	63	84
35	56	49	21

Multiplication Properties



Finish

1 [illegible] 4x1

(3x2)x6 = 3x(2x6)

6 x 0 = 0

4x5 = 5x4

1 x 6 = 6

8 x 1 = 8

(7x3)x2=7x(3x2)

8x6 = 6x8

0 x 9 = 0

5x2 = 2x5

(9x5)x7=9x(5x7)

5 x 1 = 5

1 x 7 = 7

9x6 = 6x9

0 x 1 = 0

(3x4)x5=3x(4x5)

(5x8)x9=5x(8x9)

5 x 0 = 0

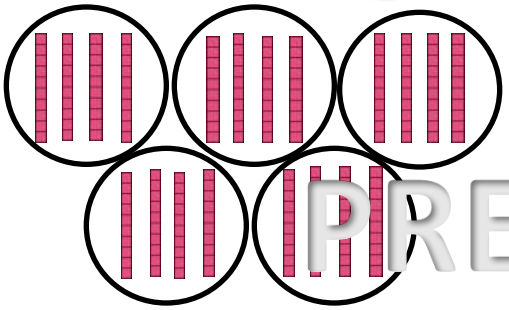
8x9 = 9x8

Start Player One

Start Player Two

Directions: Place a token on start. Spin the spinner using a paperclip and pencil. Read the spinner and slide the token to the adjoining space **IF** the equation in the space matches the property you spun on the spinner. If it doesn't, you cannot move. Alternate turns until you finish.

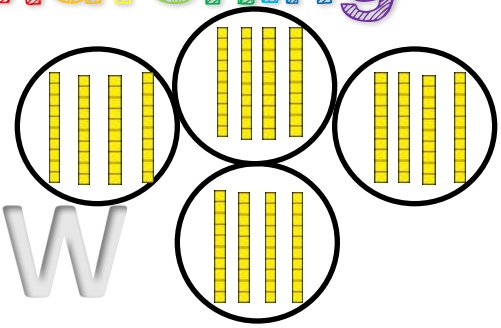
Matching



Multiples of 10

7

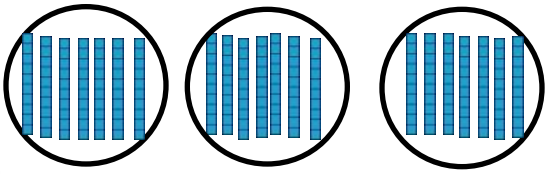
Matching



Multiples of 10

8

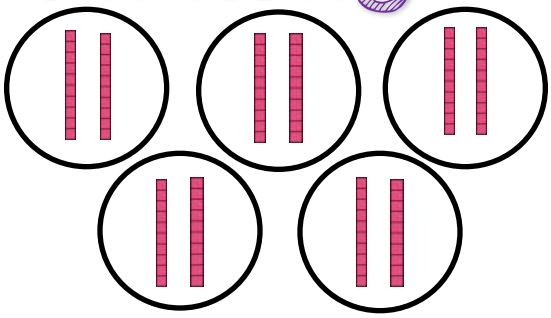
Matching



Multiples of 10

9

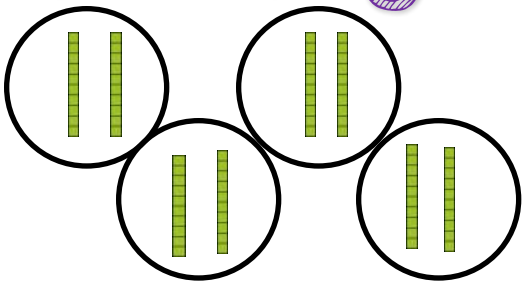
Matching



Multiples of 10

10

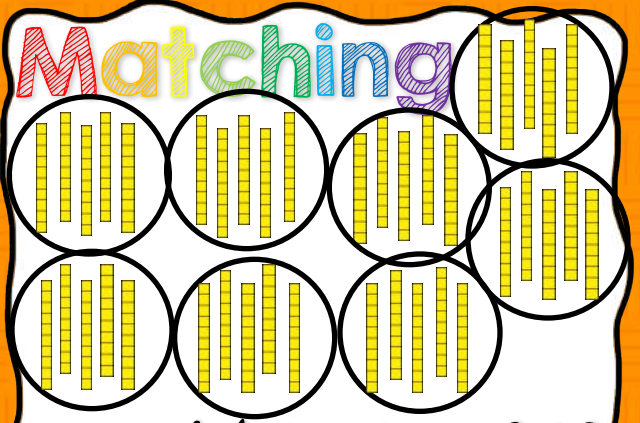
Matching



Multiples of 10

11

Matching



Multiples of 10

12

Directions: Cut on the solid black line. Fold on the dotted line. Glue down the center piece that states "Patterns of Multiples of 10." Then under each flap write the answer to the problem. In your notebook, write the pattern you discovered.

8 x 4	Patterns of Multiples of 10	7 x 3
8 x 40		7 x 30
8 x 400		7 x 300
8 x 4000		7 x 3000

A Special Thank You!

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Happy Teaching!

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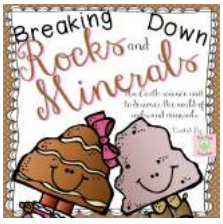
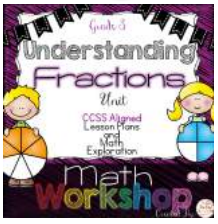


A variety of Science Units with Lesson Plans



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