Grade 3
Everyday Math:
Unit 5
Fractions & Multiplication Strategies
Study Guide
EDM Version 4
Thank you!

Catherine Wiist @ Abc123is4me
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Credits:
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Grade 3

Everyday Math: Unit 5
Fractions and Multiplication Strategies

Study Guide

Unit Vocabulary:

- add a group
- break-apart strategy
- decompose
- denominator
- doubling
- equal parts
- equivalent fractions
- even
- factor
- fraction
- helper facts
- missing factor
- multiples
- near squares
- numerator
- odd
- product
- subtract a group
- unit fraction
- whole
Lesson 5.1: Exploration A: How do you create equal parts of different wholes? Circle the picture that shows 1-thirds of the whole.

The Whole  
A.  
B.  

Exploration B: How do you solve problems involving area and perimeter? Circle the pentominoe that has a different perimeter measurement than the other two.

A.  
B.  
C.  

Exploration C: How do you represent fractions of different wholes?

A. The square is the whole.  

A fraction that names the shaded part is ________________.

B. The rectangle is the whole.

A fraction that names the shaded part is ________________.
Lesson 5.2:
How do you represent fractions using standard notation, words, and drawings?

Complete the table.

<table>
<thead>
<tr>
<th>Picture</th>
<th>Words</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example:</td>
<td>two-thirds</td>
<td>( \frac{2}{3} )</td>
</tr>
<tr>
<td><img src="image1.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
<td><img src="image3.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>

The whole is the circle you will draw in this box below. Divide the circle into four equal parts. Shade up to three of its parts.
Lesson 5.3:
How can you recognize equivalent fractions?

# 1:  Divide the rectangle into 4 equal-size parts.
      Shade and label one part with a fraction.

#2:  Diego turns over these two cards during a game of Fraction Memory. He thinks he
      found a pair of equivalent fractions.

      a.  Do you agree?  Explain your thinking.

      __________________________________________________________________________
      __________________________________________________________________________

      b.  Use your fraction cards to find a different pair of equivalent fractions.  Record
           your fractions on the lines below.

           _______ = _______

Pg. 3
Lesson 5.4:
How do you apply your knowledge of helper facts to solve harder multiplication facts?

#1: For the helper fact below:
* Record a helper fact.
* Use your helper fact and either add or subtract a group.
* Use words, numbers, or pictures to show your thinking.
* Write the product.

9 x 8 = ?

Helper Fact: _____ x _____ = _____

How can I use the helper fact: _____________________________________________________
___________________________________________________________________________________

9 X 8 = ______

#2: Lynne and Dan are working together to solve 6 x 7.

* Lynne says: “I think 6 x 6 will help as our helper fact.”
* Dan says: “I think 7 x 7 will help as our helper fact.”

With whom do you agree? Explain.
Lesson 5.5:
How does using the strategy of doubling help to find the area of a larger rectangle?

Explain two different ways you could use doubling to solve $4 \times 6 = ?$
You may draw rectangles to help.

a. One way:
   
   Helper fact: _____ x _____ = _____

   How I did it:

   ____________________________________________________________________________________________

   ____________________________________________________________________________________________

b. Another way:
   
   Helper fact: _____ x _____ = _____

   How I did it:

   ____________________________________________________________________________________________

   ____________________________________________________________________________________________
Lesson 5.6:
How do you apply the doubling strategy to solve multiplication facts?

Show how you can solve $5 \times 6$ using doubling.

Factor I will split in half: _____

Sketch:

$5 \times 6 = _____$

What helper fact did you double to solve $5 \times 6$?

_________________________

Lesson 5.7:
How do you identify and explain arithmetic patterns using properties of operations?

Complete the table of 5s multiplication facts below.

<table>
<thead>
<tr>
<th>Fact</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1 \times 5$</td>
<td></td>
</tr>
<tr>
<td>$2 \times 5$</td>
<td></td>
</tr>
<tr>
<td>$3 \times 5$</td>
<td></td>
</tr>
<tr>
<td>$4 \times 5$</td>
<td></td>
</tr>
</tbody>
</table>

What patterns did you notice in the products?

__________________________________________________________________________________

__________________________________________________________________________________
Lesson 5.8:
How do you identify the missing factor in a multiplication problem?

Mike is playing a round of *Salute!* The dealer says 32. His partner has a 8 on her forehead.

a. What number does Mike have? ______

b. Write a multiplication number sentence and a division number sentence for this problem.

______________________________        ______________________________

c. How do your number sentences show the same *Salute!* round?

________________________________________________________________________________
_________________________________________________________________________________

Lesson 5.9:
How can the product of a multiplication square help you find the product of near squares?

Near square: 6 x 7 = ?

Square helper fact: _____ x _____ = _____

How does your square helper fact help you solve the near square?

________________________________________________________________________________
_________________________________________________________________________________

6 x 7 = _____
Lesson 5.10:
How do you solve a number story?

Solve the number story.

People are donating $10 each to the animal shelter. The animal shelter has collected $130 so far. Its goal is to collect $200. How many more people do they need to donate money?

______________________

(unit)

Lesson 5.11:
How do you use the break-apart strategy to solve multiplication problems?

Julio is trying to solve 7 x 9.

He sketched a rectangle to help him think about how to break apart the numbers so that the fact is easier to solve. Here is his sketch:

Use numbers or words to explain how Julio can use his sketch to solve 7 x 9

7 x 9 = _______
Unit Vocabulary:
- add a group
- break-apart strategy
- decompose
- denominator
- doubling
- equal parts
- equivalent fractions
- even
- factor
- fraction
- helper facts
- missing factor
- multiples
- near squares
- numerator
- odd
- product
- subtract a group
- unit fraction
- whole
Lesson 5.1:

Exploration A: How do you create equal parts of different wholes?
Circle the picture that shows 1-thirds of the whole.

The Whole

A.

B.

Exploration B: How do you solve problems involving area and perimeter?
Circle the pentomino that has a different perimeter measurement than the other two.

A.

B.

C.

Exploration C: How do you represent fractions of different wholes?

A. The square is the whole.

B. The rectangle is the whole.

A fraction that names the shaded part is \( \frac{1}{2} \) half.

A fraction that names the shaded part is \( \frac{1}{4} \) fourth.
Lesson 5.2:
How do you represent fractions using standard notation, words, and drawings?
Complete the table.

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<th>Number</th>
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</thead>
<tbody>
<tr>
<td><img src="example.jpg" alt="Example:" /></td>
<td>two-thirds</td>
<td>( \frac{2}{3} )</td>
</tr>
<tr>
<td><img src="example.jpg" alt="Example:" /></td>
<td>two-fourths OR one-half</td>
<td>( \frac{2}{4} ) OR ( \frac{1}{2} )</td>
</tr>
<tr>
<td><img src="example.jpg" alt="Example:" /></td>
<td>five-sixths</td>
<td>( \frac{5}{6} )</td>
</tr>
</tbody>
</table>

The whole is the circle you will draw in this box below. Divide the circle into four equal parts. Shade up to three of its parts.

Answers will vary

\[ \text{\textbf{Answers will vary}} \]
Lesson 5.3:
How can you recognize equivalent fractions?

# 1: Divide the rectangle into 4 equal-size parts. Shade and label one part with a fraction.

#2: Diego turns over these two cards during a game of Fraction Memory. He thinks he found a pair of equivalent fractions.

a. Do you agree? Explain your thinking.

Yes: Sample Answer: The shaded area of each circle on the cards is the same size.

b. Use your fraction cards to find a different pair of equivalent fractions. Record your fractions on the lines below.

Answers will vary

\[
\frac{1}{4} = \frac{2}{8}
\]
Lesson 5.4:
How do you apply your knowledge of helper facts to solve harder multiplication facts?

#1: For the helper fact below:
* Record a helper fact.
* Use your helper fact and either add or subtract a group.
* Use words, numbers, or pictures to show your thinking.
* Write the product.

9 x 8 = ?

Helper Fact: _____ x _____ = _____

How can I use the helper fact: _____________________________________________________
___________________________________________________________________________________
9 x 8 = _______

Sample Answer:

#2: Lynne and Dan are working together to solve 6 x 7.

* Lynne says: “I think 6 x 6 will help as our helper fact.”
* Dan says: “I think 7 x 7 will help as our helper fact.”

With whom do you agree? Explain. Sample Explanations:

I agree with Lynne because she can add a group of 6 to 6 x 6 to find 6 x 7 because of the turn-around rule. I agree with Dan because he can subtract a group of 7 from 7 x 7 to get the answer to 6 x 7. I agree with both because 6 x 7 is a near-squares fact for 6 x 6 and 7 x 7, so they can either add or subtract a group to get the answer.
Lesson 5.5:
How does using the strategy of doubling help to find the area of a larger rectangle?

Explain two different ways you could use doubling to solve $4 \times 6 = ?$
You may draw rectangles to help.

a. One way:
   Helper fact: $\underline{2} \times \underline{6} = \underline{12}$

   How I did it:
   
   \[ \underline{I\ started\ with\ 2 \times 6 = 12\ and\ doubled\ it.\ 12 + 12 = 24,} \]
   \[ \underline{so\ 4 \times 6 = 24} \]

b. Another way:
   Helper fact: $\underline{4} \times \underline{3} = \underline{12}$

   How I did it:
   
   \[ \underline{I\ started\ with\ 4 \times 3 = 12\ and\ doubled\ it.\ 12 + 12 = 24,} \]
   \[ \underline{so\ 4 \times 6 = 24} \]
Lesson 5.6:
How do you apply the doubling strategy to solve multiplication facts?

Show how you can solve $5 \times 6$ using doubling.

Factor I will split in half: \[6\]

\[5 \times 6 = 30\]

What helper fact did you double to solve $5 \times 6$?

\[3 \times 5 = 15\]

\[3 \times 5 = 15\]

\[15 + 15 = 30\]

Lesson 5.7:
How do you identify and explain arithmetic patterns using properties of operations?

Complete the table of 5s multiplication facts below.

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</tr>
<tr>
<td>$2 \times 5$</td>
<td>10</td>
</tr>
<tr>
<td>$3 \times 5$</td>
<td>15</td>
</tr>
<tr>
<td>$4 \times 5$</td>
<td>20</td>
</tr>
</tbody>
</table>

What patterns did you notice in the products?

The product goes in an odd, even pattern. The product always ends in a 5 and then a 0. The product increases by 5 each time.
Lesson 5.8:
How do you identify the missing factor in a multiplication problem?

Mike is playing a round of Salute! The dealer says 32. His partner has an 8 on her forehead.

a. What number does Mike have? 4

b. Write a multiplication number sentence and a division number sentence for this problem.

\[ 8 \times 4 = 32 \quad 32 \div 8 = 4 \]

c. How do your number sentences show the same Salute! round?

I can think multiplication and ask, “8 times what number is 32?”
I can also think division and ask, “How many groups of 8 are there in 32?”

Lesson 5.9:
How can the product of a multiplication square help you find the product of near squares?

Near square: \(6 \times 7 = ?\)

Square helper fact: \(6 \times 6 = 36\)

How does your square helper fact help you solve the near square?

I can start at 36 and add one more group of 6. \(36 + 6 = 42\).

\[6 \times 7 = 42\]
Lesson 5.10:
How do you solve a number story?

Solve the number story.

People are donating $10 each to the animal shelter. The animal shelter has collected $130 so far. Its goal is to collect $200. How many more people do they need to donate money?

7 people

(1 unit)

Lesson 5.11:
How do you use the break-apart strategy to solve multiplication problems?

Julio is trying to solve 7 x 9.

He sketched a rectangle to help him think about how to break apart the numbers so that the fact is easier to solve. Here is his sketch:

7  x 9 = _______

Julio’s rectangle is in two pieces. The first rectangle shows 7 x 5 = 35. The second rectangle shows 7 x 4 = 28. So the total is 35 + 28 = 63.