Flip Book

This document is intended to show the connections to the Standards of Mathematical Practices for the   content standards and to get detailed information at each level   . Resources used: CCSS, Arizona DOE, Ohio DOE D Q G   1 R U W K   & D U R O L Q D   ' 2 (7 K L V   ³) O L S   % R R N ´   L V   L Q W H Q G understand what each standard means in terms of what students must know and   be able to do. It provides only a   sample   of instructional strategies and examples. The goal of every teacher should be to guide students in understanding & making sense of mathematics.

1. Make sense of problems and persevere in solving them.

7 K H \ P D \ F K H F N W K H L U W K L Q N L Q J E \ D V N L Q J W K H P V H O Y H V ³ ' R H V W

2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning of others.

P D W K H P D W L F D O G L V F X V V L R Q V L Q Y R O Y L Q J T X H V W L R Q V O L N H ³ + R Z G L G \ R X
7 K H \ H [S O D L Q W K H L U W K L Q N L Q J W R R W K H U V D Q G U H V S R Q G W R R W K H U V ¶ W

4. Model with mathematics.

5. Use appropriate to   ols strategically.

6. Attend to precision.

Summary of Standards for Mathematical Practice	Questions to Develop Mathematical Thinking
1. Make sense of problems and persevere in solving them. • Interpret and make meaning of the problem to find a starting point. Analyze what is given in order to explain to themselves the meaning of the problem. • Plan a solution pathway instead of jumping to a solution. • Monitor their progress and change the approach if necessary. • See relationships between various representations. • Relate current situations to concepts or skills previously learned and connect mathematical ideas to one another. • Continually ask themselves, ˝Ž! fi (Ł&#) fŁ (Łfi' (fi\$' ، #) ⁄*fi) ' fi⁄ Can understand various approaches to solutions.	How would you describe the problem in your own words? How would you describe what you are trying to find? What do you notice about...? What information is given in the problem? Describe the relationship between the quantities. Describe what you have already tried. What might you change? ˝˘Ž! fi (Ł&#) fŁ (Łfi' (fi\$' ، #) ⁄*fi) ' fi⁄ to this point. What steps in the process are you most confident about? What are some other strategies you might try? What are some other problems that are similar to this one? How might you use one of your previous problems to help you begin? How else might you organize...represent... show...?

2. Reason abstractly and quantitatively.

• Make sense of quantities and their relationships.
• Decontextualize (represent a sitf(z)-2(e)(o)-3()-2(08b3(g t)-3()

Summary of Standards for Mathematical Practice

Operations and Algebraic Thinking (OA)

3.OA.1   ×

For example, describe   a context in which
a total   number of objects can be expressed as 5 × 7

<u>Standards for Mathematical Practices to be emphasized:</u>

×

÷   □

×

T X H V W L R Q V   V X F K   D V   ³ + R Z   P D Q \   V   D U H   L Q   " ´   R U   ³   W L P H V   Z K D W   Q X

Instructional Resources/Tools

Operations and   Algebraic Thinking (OA)

3.OA.2.

Operations and Algebraic Thinking (OA)
3.OA.3.
Standards for Mathematical Practices to be emphasized:

Connections

Explanations and Examples:

(4 x 9 = 36, 36 ÷ 6 = 6).

Examples of division problems:

x

    o

x

  o

Starting	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6

：3.OA.4.

For example, determine t　he　unknown number that makes the equation true in each of the equations 8　× ? = 48, 5 =　÷ 3, 6 × 6 = ?.

Standards for Mathematical Practices to be emphasized:

Connections

Explanations and Examples:

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fact families

inverse relationship

J R I W K H P H D Q L Q J R I W K H H T X D O V L J Q D V

‡
‡
‡
‡

Example

÷ □

m

This standard is strongly connected to 3.AO.3 when students solve problems and determine unknowns in equations.　　Students should also experience creating story problems for given equations. When crafting story problems, they should carefully consider the question(s) to be asked and answered to write an appropriate equation. Students may approach the same story proble m differently and write either a multiplication equation or division equation.

6WXGHQWV DSSO\ WKHLU XQGHUVWDQGLQJ RI WKH PHDQLQJ RI WKH HTXD

    x
    x
    x

Operations and Algebraic Thinking (OA)
3.OA.5. 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.)
<u>Standards for Mathematical Practices to be emphasized:</u>

<u>Connections</u>   (3 .OA. 5 - 6)

Developing
 understanding of multipl   ication and division and strategies for multiplication and

KH\ NQRZ WR VROYH SURGXFWV WKH\ GRQ¶

Operations and Algebraic Thinking (OA)
3.OA.6.   For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.

Standards for Mathematical Practices to be emphasized:

Operations and Algebraic Thinking (OA)
3.OA.7. ⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀× ⠀⠀÷

Standards for Mathematical Practices to be emphasized:

Connections

⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀Developing understanding of multiplication and division and strategies for multiplication and division within 100

Explanations and Examples:

⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀using a reasonable amount of steps and ⠀⠀⠀time

³. Q R Z ⠀I U R P ⠀P H P R U ⠀not

<u>Instructional   Strategies   :</u>

This is called unitizing

Operations and Algebraic Thinking (OA)

3.OA.8

Student 3

Examples:
   x
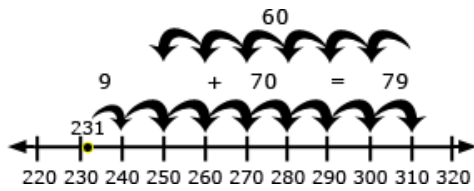
$ V W X G H Q W   P D \   X V H   W K H   Q X P E H U   O L Q H   D E R Y H   W R   G H V F U L E H   K L V   K H U   W

                                                            E D F N   ´

                                    ±   ±

                                    ±

   x

w	w	13
63		

      V W X G H Q W   P L J K W   W K L Q N   ³,   N Q R Z   W K D W   W K H   W Z R   Z U L V W E D Q G V   F R V W

         ´
      ÷

   x
   x

<u>Instructional Strategies</u>   : (3.OA.8   - 9)

Operations and Algebraic Thinking (OA)
3.OA.9. 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.
<u>Standards for Mathematical Practices to be emphasized:</u>
<u>Connections</u>
<u>Explanations and Examples:</u>   ‡ ‡ ‡ ‡   When (commutative property) one changes the order of the factors they will still gets the same product, example 6 x 5 = 30 and 5 x 6 = 30.   Example ‡ ‡ ‡ ‡ ‡ ‡ ‡

Addend	Addend	Sum

The Alternate Achievement Standards for Students With the Most
Significant Cognitive Disabilities Non - Regulatory Guidance states,
³ « P D W H U L D O V   V K R X O G   V K R Z D the content standards for the
grade in which the student is enrolled, although the grade - level content
may be reduced in complexity or modified to reflect pre - U H T X L V L W H   V N L O O V
Throughout the Standards descriptors such as, describe, count, identify,
etc,   should be interpreted to mean that the students will be taught and
tested according to their mode of communication   .

North Carolina DOE

Third Grade Mathematics Operations and Algebraic Thinking (3.OA)		
Common Core State Standards	Essence	Extended Common Core
Represent and solve problems involving multiplication and division	Represent and solve problems	Represent and solve problems
Cluster 1. 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. 2. 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 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 groups can be expressed as 56 ÷ 8. 3. 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. 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 =?	**Cluster**	1. Compose and decompose numbers on both sides of the equal sign to show equality. 2. Solve addition and subtraction problems when result is unknown (i.e. 8 + 2 = , 6 3 =).

Understand properties of multiplication and the relationship between multiplication and division	Build foundation for multiplication through repeated addition	Represent repeated addition
5. Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × × 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 c find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 16 = 56. (Distributive property.) 6. Understand division as an unknown factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.		3. Build mo___present repeated addition. (i.e., 2grou___e same quantity as 4 + 4) 4. Share e___ctions of up to 30 items betwe 2 to 4 peo___real life story problems.

<u>Instructional Strategies</u>
Prior to implementing rules for rounding students need to have opportunities to investigate place value. A strong understanding of place value is essential for the developed number sense and the subsequent work that involves rounding numbers.

Building on previous understandings of the place value of digits in multi-digit numbers, place value is used to round whole numbers. Dependence on learning rules can be eliminated with strategies such as the use of a number line to determine ZKLFK PXOWLSOH RI RU RI D QXPEHU LV QHDUHVW RU PRUH URXQ understanding of place value increases, the strategies for rounding are valuable for estimating, justifying and predicting the reasonableness of solutions in problem-solving.

Strategies used to add and subtract two-digit numbers are now applied to fluently add and subtract whole numbers within

Number and Operations in Base Ten (NBT)

Example:
x

x

x

x

The Alternate Achievement Standards for Students With the Most
Significant Cognitive Disabilities Non   - Regulatory Guidance   states,
 ³ « P D W H U L D O V   V K R X O G   V K R Z   D   F O H D U   O L Q N   W R   W K H   F R Q W H Q W
grade in which the student is enrolled, although the grade   - level content
may be reduced in complexity or modified to reflect pre   - U H T X L V L W H   V N L O O V
Throughout the Standards descriptors such as, describe, count, identify,
etc, should be interpreted to mean that the students will be taught and
tested according to th   eir mode of communication   .

N orth   Carolina

Number and Operations ² Fractions (NF)
3.NF.1.　　　　　　　　　　　　b 　b　　　　　　　　　　　　　　　　a b　　　　　　　a　　　　b
Standards for Mathematical　　　　Practices to be emphasized:
Connections　　(3.NF.1 - 3)
Explanations and Example　　　s:

Set models

x

‡
‡
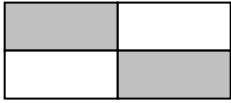
o

‡
‡

o ¾
o　　　　　　　　　one fourth, two fourths, three fourths.

₃　　　　　　´

<u>Common Misconceptions: (3.NF.1) </u>

3.NF.2.

b
b   b
                              b
        a b   a

$$\frac{1}{8}$$

$$\frac{1}{2}$$

½

Measurement and Data (MD)
3.MD.1.

Standards for Mathematical Practices to be emphasized:

Measurement and Data (MD)

3.MD.2.

Measurement and Data (MD)
3.MD.3. V W H S ³ K R Z P D Q \ P R U H ´ D Q G ³ K R Z P D Q \ O H V V ´ For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

<u>Standards for Mathematical Practices to be emphasized:</u>

<u>Connections</u>   (3.MD.3 - 4)

Developing understanding of fractions, especially unit fractions(fractions wi th numerator 1) Solving multi - step problems

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±

<u>Explanations and Examples:</u>

x

‡ +RZ PDQ\ PRUH QRQILFWLRQ ERRNV ZKHUH UHDG WKDQ IDQWDV\
‡ 'LG PRUH SHRSOH UHDG ELRJUDSK\ DQG P\VWHU\ ERRNV RU ILFW
‡ $ERXW KRZ PDQ\ ERRNV LQ DOO JHQUHV ZHUH UHDG"
‡ 8VLQJ WKH

‡ :KDW LQWHUYDO ZDV XVHG IRU WKLV VFDOH"
‡ :KDW FDQ ZH VD\ DERXW W\SHV RI ERRNV UHDG" :KDW LV D W\SL
‡ ,I \RX ZHUH WR S

Instructional Strategies____: (3.MD.3 - 4)

■

□

Measurement and Data (MD)
3.MD.4.
²

<u>Standards for</u>   <u>Mathematical Practices to be emphasized:</u>

<u>Connections</u>

<u>Explanations and Examples:</u>

V \ V W H P V , W ¶ V L P S R U W D Q W W R U H Y L H Z Z L W K V W X G H Q W V K R Z W R

Measurement and Data (MD)
3.MD.5.

$ V T X D U H   Z L W K   V L G H   O H Q J W K   X Q L W   F D O O H G   ³D   X Q L W   V T X D U H

n

n |

Standards for Mathematical Practices to be emphasized:

Measurement and Data (MD)
3.MD.6.

Standards for Mathematical Practices to be emphasized:

Measurement and Data (MD)
3.MD.7

a

b   c   a × b   a × c

<u>Standards for Mathematical Practices to be emphasized:</u>

7KLV VWDQGDUG H[WHQGV VWXGHQWV¶ ZRUN ZLWK WKH GLVWULE

Measurement and Data (MD)

3.MD.8.

Instructional Strategies   :

n   n

Common Misconceptions:

The Alternate Achievement Standards for Students With the Most Significant
Cognitive Disabilities Non   -Regulatory Guidance   V W D W H V   ³ « P D W H U L D O V   V K R X O O
clear link to the content standards for the grade in which the student is enrolled,
although the grade   -level content may be reduced in complexity or modified to
reflect pre   -U H T X L V L W H   V N L O O V   ´   7 K U R X J K R X ¥³ V ° H

Geometry   (G)

Reason with shapes and their attributes.

3.G.1

Example

The Alternate Achievement Standards for Students With the Most Significant
Cognitive Disabilities Non   - Regulatory Guidance   V W D W H V   ³ « P D W H U L D O V   V K R X O
clear link to the content standards for the grade in which the student is enrolled,
although the grade   - level content may be reduced in complexity or modified to
reflect pre   -

T_{ABLE}1. Common addition and subtraction situations.[34]

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[34] Adapted from Box 2‑4 of Mathematics Learning in Early Childhood, National Research Council (2009, pp. 32, 33).
[35] These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean makes or results in but always does mean