Math – Number Operations Fractions

Louisiana Student Standard

- **3.NF.A.1** Understand a fraction 1/*b*, with denominators 2, 3, 4, 6, and 8, as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

Louisiana Connector

- **LC.3.NF.A.1a** Identify the number of highlighted parts (numerator) of a given representation (rectangles and circles).

Concrete Understandings:

- Understand that fractions are equal parts of a whole (i.e., Describe that the denominator of a fraction represents the number of equal parts within a whole (length unit or region).
- Count using one-to-one correspondence.

Representation:

- Apply understanding that the numerator represents the parts of the whole (i.e., how many of the parts are being considered). Begin with unit fraction which are fractions with a numerator of 1.
- Understand the following concepts, symbols, and vocabulary: numerator, fraction, equal parts.

Suggested Instructional Strategies:

- Folding a sentence strip into 2, 4, and 8 equal pieces
- Folding a sentence strip into 3 and 6 equal pieces
- Model-Lead-Test
- Partitioning: Breaking an object or set of objects into pieces
- Pizza Fractions: Using cutout of pizza/pizza circle with fractions written on them that can be placed on a fraction template
- Ruler and/or yardstick: Use a ruler or yardstick with sticky dots on it to indicate whole or parts on a number line

Suggested Supports and Scaffolds:

- Visual models with pre-marked and pre-divided regions
- Graph paper
- Manipulatives
- Rectangles and circles with raised edges on highlighted section
- Assistive technology
- iPad applications

- Objects (e.g., apples) shared equally and matched with a fraction card

Louisiana Student Standard

- **3.NF.A.1** Understand a fraction 1/*b*, with denominators 2, 3, 4, 6, and 8, as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.

Louisiana Connector

- **LC.3.NF.A.1b** Identify the total number of parts (denominator) of a given representation (rectangles and circles).

Concrete Understandings:

- Understands that fractions are equal parts of a whole (i.e., Describe that the denominator of a fraction represents the number of equal parts within a whole (length unit or region).
- Count using one-to-one correspondence.

Representation:

- Understand that the denominator of the fraction indicates the number of equal parts of the parts.
- Understand the following concepts, symbols, and vocabulary: denominator, fraction, equal parts.

Suggested Instructional Strategies:

- Folding a sentence strip into 2, 4, and 8 equal pieces
- Folding a sentence strip into 3 and 6 equal pieces
- Model-Lead-Test
- Partitioning: Breaking an object or set of objects into pieces
- Pizza Fractions: Using cutout of pizza/pizza circle with fractions written on them that can be placed on a fraction template
- Ruler and/or yardstick: Use a ruler or yardstick with sticky dots on it to indicate whole or parts on a number line

Suggested Supports and Scaffolds:

- Visual models with pre-marked and pre-divided regions
- Graph paper
- Manipulatives
- Rectangles and circles with raised edges on highlighted section
- Assistive technology
- iPad applications
- Objects (e.g., apples) shared equally and matched with a fraction card

Louisiana Student Standard

- **3.NF.A.1** Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitions into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.

Louisiana Connector

- **LC.3.NF.A.1c** Identify the fraction that matches the representation (rectangles and circles; halves, fourths, thirds, eighths).

Concrete Understandings:

- Identify the parts of a region and the whole region when a region is partitioned when item is divided.
- Count the number of the parts selected (e.g., 3 of the 4 parts; have fraction present but not required to read ¾).

Representation:

- Understand how parts of a whole can be expressed as fractions using numbers.
- Understand a fraction *1/b* as the quantity formed by 1 part when a whole is partitioned into b equal parts.
- Recognize that fraction bars of equal lengths can be divided into different numbers of equal parts/units.
- Understand a fraction *a/b* as the quantity formed by a parts of size *1/b*.
- Ability to recognize that the more equal parts, the smaller the part.
- Understand the following concepts, symbols, and vocabulary: numerator, denominator, _/_.

Suggested Instructional Strategies:

- Before introducing fraction, use fraction bars:
  - Describe a fraction bar in multiple ways (e.g., present a fraction bar with four parts and two parts shaded red and describe the representation as the color and the number of parts shaded (a red bar with two parts shaded); four parts and two parts shaded (without using color); or two out of four parts are shaded).

  - Explicitly teach types of fraction bars (whole bars with all parts shaded; whole bars divided into parts with no parts shaded; whole bars with half of the parts shaded).
  - Explicitly teach that parts out of total parts shaded (e.g., two out of four parts shaded) is the language we use to name the fraction (2/4).
- Teach fractions explicitly as a way to indicate part of a whole.
- Teach explicitly that as the numerator increases, there will be more parts.
- Multiple Exemplars (e.g., fraction bars and fractions)
  - Exemplar/Non-exemplar: Here is picture/representation of ½ (present a fraction bar). This is the fraction ½. This is the fraction ½. This is not the fraction ½. Show me a fraction bar that represents ½.
- Task Analysis
  - Present a shaded fraction bar with the associated fraction.
  - State that the number is called a fraction.
  - State how to determine the fraction (e.g., I have a blue bar with 4 parts/units. Two of the parts are shaded. The fraction is two over four or two-fourths.
  - State that for the fraction (e.g., 2/4), the denominator means to divide something into "four" equal parts and the numerator "2" indicates 2 of these parts.
  - Present the fraction and have the student create/select the associated representation of the fraction.
- Have the student give fraction statements that are true for a provided group of objects. For example, 2 out of 3 or 2/3 of the pencils are yellow. Show the corresponding fraction.
- Provide "hands on" opportunities to create fractions (e.g., salt dough, pies)

Suggested Supports and Scaffolds:

- Geoboards
- Dot-paper
- Cuisenaire rods
- Color tiles
- Pattern blocks or sets of objects
- Pie diagrams
- Fraction bars that are ruled into certain fixed partitions
- Assistive technology
- Pad applications
- Objects (e.g., apples) shared equally and matched with a fraction card

Louisiana Student Standard

- **3.NF.A.2** Understand a fraction with denominators 2, 3, 4, 6, and 8 as a number on a number line diagram.

a. Represent a fraction 1/ b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.

b. Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

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- **LC.3.NF.A.1d** Identify that a part of a rectangle can be represented as a fraction that has a value between 0 and 1.

Concrete Understandings:

- Understands that fractions are equal parts of a whole (i.e., Describe that the denominator of a fraction represents the number of equal parts within a whole (length unit or region).

Representation:

- Partition the rectangle based on the number in the denominator.
- Understand the following concepts, symbols, and vocabulary: partition, divide, equal parts, fraction.

Suggested Instructional Strategies:

- Use multiple exemplar or time delay to teach parts of a whole
- Have students show a subset of a set (1 of the 6 objects are red/square/rough)
- Use Model-Lead-Test to demonstrate and teach students to fold sentence strips
- Use Model-Lead-Test to demonstrate and teach students draw regions and partition on graph paper

Suggested Supports and Scaffolds:

- Color tiles
- Pattern blocks or sets of objects
- Pie diagrams
- Fraction bars that are ruled into certain fixed partitions
- Assistive technology
- iPad applications
- Objects (e.g., apples) shared equally and matched with a fraction card

Louisiana Student Standard

- **3.NF.A.1** Understand a fraction 1/*b*, with denominators 2, 3, 4, 6, and 8, as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*

Louisiana Connector

- **LC.3.NF.A.1e** Select a model of a given fraction (halves, thirds, fourths, sixths, eighths).

Concrete Understandings:

- Differentiate between parts of a whole and the whole itself.
- Understand the structure of a fraction (i.e., Describe that the denominator of a fraction represents the number of equal parts within a whole (length unit or region).

Representation:

- Understand the components of a fraction (numerator and denominator).
- Understand the following concepts, symbols, and vocabulary: fraction, numerator and denominator

Suggested Instructional Strategies:

- Teach numerator = part, and denominator = whole using a model. Types of models may include area or region models (e.g., pattern blocks, pie pieces, and grid or dot paper), length models (e.g., number lines, Cuisenaire rods, fraction rods, line segment drawings, etc.), and set models (e.g., drawings using X's and O's, two-color counters in loops on paper).
- Time Delay
- Have students demonstrate a fraction by shading in the correct number of units given a fraction bar with 2, 3, 4, 6 or 8, units
- Have students show a subset of a set (1 of the 6 objects are red/square/rough)
- Use multiple exemplar training
- Use Least-to-Most prompting
- Have the student give fraction statements that are true for a provided group of objects. For example, say, "2/6 of the pencils are yellow. Show the corresponding/matching fraction." Using a shaded fraction bar, say "This show 2 parts out of 6/6 parts with 2 shaded/2 parts shaded out of 6. Show the corresponding/matching fraction

Suggested Supports and Scaffolds:

- 2-dimensional rectangle segmented into parts (vs. a pizza)
- Objects to model fractions
- One-dimensional linear models (fraction bars, number lines)
- Software such as Smart boards to create and manipulate models of fractions

Louisiana Student Standard

- **5.NBT.A.3** Read, write, and compare decimals to thousandths.

a. **Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 □ 100 + 4 □ 10 + 7 □ 1 + 3 □ (1/10) + 9 □ (1/100) + 2 □ (1/1000).**

Louisiana Connector

- **LC.5.NBT.A.3a** Read, write, or select a decimal to the hundredths place.

Concrete Understandings:

- Recognize part/whole when materials are divided into tenths.
- Count tenths to determine how many (e.g., 4 tenths; 0.4). Have the decimal present but student is not required to read.

Representation:

- Count to 100.
- Understand place value to the hundredths.
- Understand where to write a decimal point.
- Understand concepts, symbols and vocabulary: decimal, decimal point, tenths place, hundredths place.

Suggested Instructional Strategies:

- Teach explicitly how to read and write decimals to the tenths (.1) and hundredths (.01).
- Teach explicitly the relative position of a number to the decimal point and its place value.
- Task Analysis for decimals (tenths)
  - Present a 1X10 grid and ask the student how many boxes make up the grid.
  - Shade a tenth and ask how may boxes are shaded (i.e., 1 out of 10).
  - Ask the student to write or select a written form for the decimal for 1 out of 10.
  - Ask the student to read or select a recording of the decimal.
  - Complete for multiple decimals (.1 - .9).
- Task Analysis for decimals (hundredth)
  - Present a 10X10 grid and ask the student how many boxes make up the grid.
  - Shade one hundredth and ask how many boxes are shaded (i.e., 1 out of 100).
  - Ask the student to write or select a written form for the decimal for 1 out of 100.
  - Ask the student read or select a recording of the decimal.
  - Complete for multiple decimals (.01 - .99).
- Use Model-Lead-Test
- Match, write or say decimals that correspond to combinations of dollars and cents.
  - Student will read a money amount card. (The amount could be written as a decimal, with words, or using a cent sign.)

- Ask student to describe the money amount in another form (e.g., as a decimal).
- Use number cards to organize a stated number with a decimal.

Suggested Supports and Scaffolds:

- 10X10 grid paper
- Assistive technology
- Visual representations through pictures, cards, etc.
- Number line
- Place value charts
- Word cards, number cards, and grid cards for the same decimals (e.g., one tenth, .1, and a model)

Louisiana Student Standard

- **6.RP.A.3** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

a. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $30/100$ times the quantity); solve problems involving finding the whole, given a part and the percent.

Louisiana Connector

- **LC.6.RP.A.3e** Calculate a percent of a quantity as rate per 100.

Concrete Understandings:

- State a relationship to a quantity out of 100 (may need to be very small numbers and be concrete, e.g., Selects 3 from an object bundle of 100).

Representation:

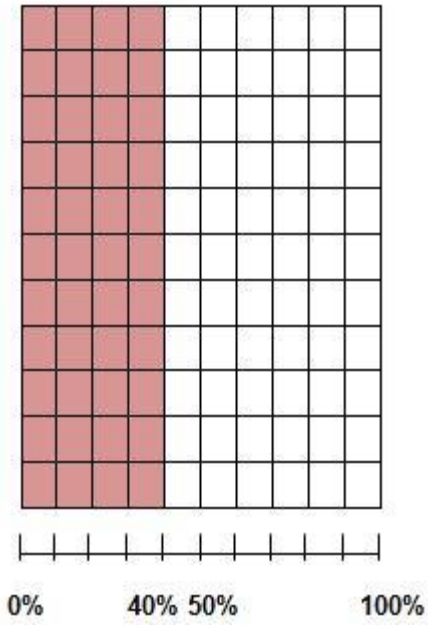
- Understand that decimals to the hundredths can be converted to percentages.
- Understand the following concepts, symbols, and vocabulary: ratio, equivalent, percent, percentage.

Suggested Instructional Strategies:

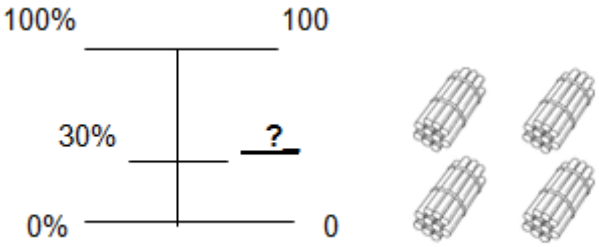
- Teach a problem solving strategy to first find the whole, part (unknown), and then percent (e.g., Percentages can be thought of as rates per 100. We want to purchase something that originally cost $12.00 but has been reduced by 25%. We know the whole is $12.00. We want to know how much we can take off of the $12.00—this is the part or the unknown. We know that it is equal to 25%. 25% of $12.00 can be solved by writing the percent in hundredths and then multiplying by the quantity. 25/100 ×12=4. 25% of $12.00 is $4.00).
- Teach explicitly three ways of expressing percent (e.g., 10 percent, 10%, 10/100).
- Connect fractions to decimals to percents, as it relates to a dollar bill.
- Begin with most common fractions/percents.
- Teach percent as "per hundred.'

Suggested Supports and Scaffolds:

- 10X10 grid and a number line to show relationship between a fraction and a percent (40% is the same as 40/100



- Dual number line: For percent problems with one part missing, one side of the line is marked with the quantities and the other with the percentages; student organizes the given information and shows which information is missing.



- Bundles of 10s and 100s
- Number line
- Hundreds chart
- Calculator
- Student may use some form of graphics to represent manipulative objects, such as tally marks, asterisks, etc. Students are to place a tally mark in the appropriate location for every

object that is to be recorded. Then, they represent the corresponding numerical sentence to the representation.

- Assistive Technology
- Blocks representing 10s and 100s
- Magnetic, paper and virtual money representing 10s and 100s
- Teach using a real-world application.

Louisiana Student Standard

- **3.NF.A.3** Explain equivalence of fractions with denominators 2, 3, 4, 6, and 8 in special cases, and compare fractions by reasoning about their size.

a. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Louisiana Connector

- **LC.3.NF.A.3a** Use =, <, or > to compare two fractions with the same numerator or denominator.

Concrete Understandings:

- Understand the concept of a fraction (a fraction is less than a whole).
- Understand the concept of comparison (greater than, less than, equal).
- Use concrete representation to determine if a fraction is equal, greater than, less than, another fraction with either the same numerator or denominator (e.g., divide a rectangle into fourths and compare ¼ to ¾, break into 4 equal parts…which is more the 3 parts or the 1 part?).

Representation:

- Apply understanding of the symbols of <, >, and = with whole numbers.
- Label pictorial representations of fractions, numerator, denominator.

Suggested Instructional Strategies:

- Multiple exemplars for equal, greater than, less than
- Explicit teaching of the rules of denominator and numerator
- Explicit teaching of comparisons (more of the same size parts, same number of parts but different sizes, more and less than ½ or 1 whole, distance from ½ or 1 whole)
- Choose your answer, explain why you chose the answer, test your answer

Suggested Supports and Scaffolds:

- Number line with fractions
- Illustrations
- Interactive whiteboard

- Computer software
- Examples of illustrations to show greater than less than, or equal
- Manipulatives

Louisiana Student Standard

- **4.NF.A.2** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)

Louisiana Connector

- **LC.4.NF.A.2a** Use =, <, or > to compare 2 fractions (fractions with a denominator or 10 or less).

Concrete Understandings:

- Understand the concept of a fraction (i.e., Describe that the denominator of a fraction represents the number of equal parts within a whole (length unit or region).
- Understand the concept of comparison (greater than, less than, equal).
- Identify concrete representation of a fractional part of a whole as greater than, less than, equal to another (e.g., divide a rectangle into fourths and compare ¼ to ¾; Can do by showing with parts of the whole (so relates to fractions; e.g., break into 4 equal parts…which is more the 3 parts or the 1 part?).

Representation:

- Apply understanding of the symbols of <, >, and = with whole numbers.
- Label pictorial representations of fractions.

Suggested Instructional Strategies:

- Multiple exemplars for equal, greater than, less than
- Explicit teaching of the rules of denominator and numerator
- Explicit teaching of comparisons (more of the same size parts, same number of parts but different sizes, more and less than ½ or 1 whole, distance from ½ or 1 whole)
- Choose your answer, explain why you chose the answer, test your answer

Suggested Supports and Scaffolds:

- Number line with fractions
- Illustrations
- Interactive whiteboard
- Computer software
- Examples of illustrations to show greater than less than, or equal
- Manipulatives

Louisiana Student Standard

- **3.NF.A.2** Understand a fraction with denominators 2, 3, 4, 6, and 8 as a number on a number line diagram.
  a. Represent a fraction 1/ b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.
  b. Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

Louisiana Connector

- **LC.3.NF.A.2b** Locate fractions on a number line.

Concrete Understandings:

- Show understanding of how parts of a whole can be expressed as fractions using numbers.
- Understand a fraction *1/b* as the quantity formed by 1 part when a whole is partitioned into b equal parts.
- Understand a fraction *a/b* as the quantity formed by a parts of size *1/b*.

Representation:

- Use a number line to locate whole numbers.
- Demonstrate understanding of how the numerator and denominator each influence the placement of a fraction on a number line (_/_).

Suggested Instructional Strategies:

- Use sentence strips or string to fold to create their own number line.
- Explicitly teach that the denominator is the number of equal sections between 0 and 1.
- Explicitly teach that the numerator is the number of equal sections from 0, e.g. - 3/5 means the space between 0 and 1 has 5 equal sections and 3/5 is at the end of the 3rd section from zero.
- Time delay

Suggested Supports and Scaffolds:

- Interactive whiteboard
- Computer software
- Assistive Technology
- Number line with raised markers

Louisiana Student Standard

- **3.NF.A.2** Understand a fraction with denominators 2, 3, 4, 6, and 8 as a number on a number line diagram.

a. Represent a fraction 1/ b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.

b. Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

Louisiana Connector

- **LC.3.NF.A.2c** Order fractions on a number line.

Concrete Understandings:

- Show understanding of how parts of a whole can be expressed as fractions using numbers.
- Understand a fraction *1/b* as the quantity formed by 1 part when a whole is partitioned into b equal parts.
- Understand a fraction *a/b* as the quantity formed by a parts of size *1/b*.

Representation:

- Use a number line.
- Demonstrate understanding of how the numerator and denominator each influence the placement of a fraction on a number line (_/_)
- (_/_)
- Understand the following concepts, symbols and vocabulary: "greatest to least" and "least to greatest."

Suggested Instructional Strategies:

- Folding sentence strip or paper to have students generate a number line
- Use fraction cards to place and order on a number line.
- Explicitly teach that the denominator is the number of equal sections between 0 and 1.
- Explicitly teach that the numerator is the number of equal sections from 0, e.g. - 3/5 means the space between 0 and 1 has 5 equal sections and 3/5 is at the end of the 3rd section from zero.

Suggested Supports and Scaffolds:

- Start with 3rd grade concept of only ordering fractions with same numerator and same denominator Interactive whiteboard
- Computer software
- Assistive Technology

- Number line with raised markers

Louisiana Student Standard

- **3.NF.A.3** Explain equivalence of fractions with denominators 2, 3, 4, 6, and 8 in special cases, and compare fractions by reasoning about their size.
  a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
  b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.
  c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*
  d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.
- **4.NF.A.1** Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)

Louisiana Connector

- **LC.3.NF.A.3c** Determine equivalent fractions.
- **LC.4.NF.A.1** Determine equivalent fractions.

Concrete Understandings:

- Describe equivalency with whole numbers (what is and what is not equivalent; this may begin with numbers/sets of objects: e.g., 3=3).
- Describe a model of part of a whole as a fraction.
- Identify two equivalent fractions, both represented either symbolically (i.e., in numbers) (e.g., ½ = 2/4) or as a model (i.e., picture) (e.g., pizza cut in halves and in fourths with ½ and 2/4 shaded in). If using symbolic representations, limit denominators to 2, 4, and 8 and numerators to 1-7. Use a real world context (e.g., pizza).

Representation:

- Represent fractions using shaded grids by generating pictorial representations (shading circles, or rectangles; drawing on graph paper, etc.).
- Understand the following concepts, symbols and vocabulary: fraction, equivalent fractions, numerator, denominator.

Suggested Instructional Strategies:

- Teach equivalency explicitly using bars of equal length with the same shaded amount (e.g., show that for bars of the same length, 1 part out of 2, two parts out of 4, and 3 parts out of six, are equal (the same amount of the bar is shaded broken into 1, 2 or 3 parts)).
- Teach equivalency explicitly by using bars (visual) to show that when both the numerator and the denominator are multiplied by the same "non-zero" number, the fractions remain equivalent (e.g., to remain equal, you will always multiply or divide by 1 represented in the form of a fraction (2/2).
- Teach equivalency by folding paper to create number lines- fold 2 pieces of paper the same length, fold one in half, one in fourths. Examine that 1/2 and 2/4 are the same distance from 0.
- Task analysis: Comparing fractions equal to 1/2
    - Present fraction bars of equal lengths that are divided into different numbers of parts with half of the parts shaded.
    - Write a fraction for each fraction bar.
    - Write a chain of equivalent fractions: 1/2 = 2/4 = 3/6 = 4/8.
    - Then, complete a similar activity using two bars with same amount shaded (more or less than **half** of the parts).
    - Write a fraction for each fraction bar (2/3, 4/6, 8/12).
    - Write a chain of equivalent fractions (2/3 = 4/6 = 8/12).
- Task Analysis: Making equivalent fractions
- Provide students with a candy bar or some representation divided into 12 parts.
    - Have them compare the division of the whole candy to a fraction the teacher provides.
    - Discuss the number of pieces of the candy that make up its given fraction.
    - Have students explain or demonstrate the meaning of equivalent fractions.
    - Use the representation selected to demonstrate equivalent fractions.
    - Students can make up new scenarios using other "wholes" that can be divided (a set of cards, a package of crackers, etc.).
- Task Analysis: Splitting bars to create equivalent fractions
    - Present a shaded fraction bar (e.g., 4 parts with 2 parts shaded (2/4).
    - Write/build the numeric fraction (e.g., 2/4).
    - Split each part in half, doubling the 4 parts to 8 parts doubles the shaded parts from 2 to 4).
    - Write/build the numeric new fraction (e.g., 4/8).
    - Write/build a numeric chain of equivalent fractions (2/4 = 6/8).
    - Explicitly state that when the numerator is doubled, by doubling the denominator, the fractions are equal.
    - Provide additional examples to show that by splitting the bar, increasing all parts of the bars increases the number of shaded parts.

- Use Model-Lead-Test
- Multiple exemplars (e.g., "These fractions are equivalent. These fractions are equivalent. These fractions are not equivalent.")

Suggested Supports and Scaffolds:

- Assistive Technology
- Virtual bars or tiles
- Pictures that have been divided
- Geoboards
- Dot-paper
- Cuisenaire rods
- Color tiles
- Pattern blocks or sets of objects
- Pie diagrams
- Fraction bars that are ruled into certain fixed partitions and lined up for comparisons
- Multiplication tables (e.g., 1 to 4 has the same ratio as 2 to 8)

	1	2	3	4	5	6	7	8
1	1	2	3	4	5	6	7	8
2	2	4	6	8	10	12	14	16
3	3	6	9	12	15	18	21	24
4	4	8	12	16	20	24	28	32

Louisiana Student Standard

- **4.NF.A.2** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)

Louisiana Connector

- **LC.4.NF.A.2b** Compare up to 2 given fractions that have different denominators.

Concrete Understandings:

- Understand the concept of equivalency (what is and what is not equivalent; this may begin with numbers/sets of objects: e.g., 3>2, 1<2, 10 + 5 = 15).
- Understand the concept of fraction (part of a whole) (i.e., Describe that the denominator of a fraction represents the number of equal parts within a whole (length unit or region).

Representation:

- Given a visual fraction model (region or number line), write the fraction with the correct numerator and denominator.
  Determine equivalent fractions (e.g., 1/2 = 2/4).

Suggested Instructional Strategies:

- Compare fractions represented with models (e.g., circle divided in halves and in fourths with 1/2 and 3/4 shaded in).
- Use rectangles that are the same size for students to partition and represent fractions.
- Use sentence strips/paper to generate number lines.

Suggested Supports and Scaffolds:

- Assistive Technology
- Virtual bars or tiles
- Pictures that have been divided
- Geoboards
- Dot-paper
- Cuisenaire rods
- Color tiles
- Pattern blocks or sets of objects

- Pie diagrams
- Fraction bars that are ruled into certain fixed partitions and lined up for comparisons

Louisiana Student Standard

- **3.NF.A.1** Understand a fraction 1/*b*, with denominators 2, 3, 4, 6, and 8, as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.
- **4.NF.B.3** Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)
  - Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. *Example: 3/4 = 1/4 + 1/4 + 1/4*.
  - Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples:* $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2\ 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.

Louisiana Connector

- **LC.4.NF.B.3a** Using a representation, decompose a fraction into multiple copies of a unit fraction (e.g., ¾ = ¼ + ¼ + ¼).
- **LC.3.NF.A.1f** Using a representation, decompose a fraction into multiple copies of a unit fraction (e.g., ¾ = ¼ + ¼ + ¼).

Concrete Understandings:

- Select, from given models, a model showing halves, thirds, or fourths.
- Using models demonstrate an understanding that the same denominator means equally sized portions

Representation:

- Given a visual fraction model (region or number line), write the fraction with the correct numerator and denominator.

Suggested Instructional Strategies:

- Teach explicitly using manipulatives that can be partitioned into equal sections.
- Use a number line to model decomposing fractions.
- Use graph paper or rectangles/circles for pictorial representations.
- Task Analysis: Splitting bars to create equivalent fractions
  - Present a shaded fraction bar (e.g., 4 parts with 2 parts shaded (2/4).
  - Write/build the numeric fraction (e.g., 2/4).
  - Split each part in half, doubling the 4 parts to 8 parts doubles the shaded parts from 2 to 4
  - Write/build the numeric new fraction (e.g., 4/8).
  - Write/build a numeric chain of equivalent fractions (2/4 = 6/8).

- Explicitly state that when the numerator is doubled, by doubling the denominator, the fractions are equal.
- Provide additional examples to show that by splitting the bar, increasing all parts of the bars increases the number of shaded parts.

- Use Model-Lead-Test
- Multiple exemplars (e.g., "These fractions are equivalent. These fractions are equivalent. These fractions are not equivalent.")

Suggested Supports and Scaffolds:

- Assistive technology
- Manipulatives
- Interactive whiteboard
- Computer software
- Color tiles
- Materials with raised edges

Louisiana Student Standard

- **5.NF.A.2** Solve word problems involving addition and subtraction of fractions.

a. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem.

b. Use benchmark fractions and number sense of fractions to estimate mentally and justify the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*

Louisiana Connector

- **LC.5.NF.A.2** Solve one-step word problems involving addition and subtraction of fractions with unlike denominators.

Concrete Understandings:

- Understand that the numerator tells the number of parts and the denominator tells the type of parts (e.g., fourths, halves).
- Identify what actions to take given the context and language used in the problem (e.g., "in all" means we add, "left" means we subtract).
- Build models to match fractions in a given equation (e.g., 1/3 + 2/3 =, student will build model of each fraction).

Representation:

- Identify key information in a word problem to represent the total and fraction.
- Solve fraction problems using:
  - Picture
  - Models
  - Representation cards
  - Number sentences
  - Mathematical word problems
  - Graphic representation
- Understand the following concepts, symbols and vocabulary: +, -, X, ÷.

Suggested Instructional Strategies:

- Teach explicitly how to express a verbal description of a fraction ("one-fourth" as 1/4).
- Task analysis:
  - Highlight/circle important words.
  - Choose the correct operation (+, -, x, ÷).
  - Compute the answer.
  - State the answer.

- Teach explicitly how to represent the total number of objects in a word problem as an array by creating sets based on the denominator of the provided fraction in a word problem (e.g., ½ of the 20 students would be a group of 20 objects shown as two arrays of 10 each).
- Teach explicitly how to use a number line/conversion tables to solve a word problem.
- Use Model-Lead-Test.
- Give students problems to model such as these: Charlene ate 1/4 of the sandwich at breakfast and 2/4 of the sandwich at lunch. How much of the sandwich did she eat?

Suggested Supports and Scaffolds:

- Use arrays to represent the denominator as sets.
- Number line
- Objects to represent arrays and perform operation
- Rectangular blocks engraved with dots (can be used to teach students who have visual impairment)
- Fraction strips
- Assistive Technology
- Use adapted text for word problems

Louisiana Student Standard

- **6.RP.A.3** Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios

Louisiana Connector

- **LC.6.RP.A.3b** Find a missing value (representations, whole numbers, common fractions, decimals to hundredths place, percent) for a given ratio.

Concrete Understandings:

- Create a concrete representation of a ratio (3:6 or 3 red cubes for every 6 white cubes).
- Recognize the meaning of the placement of numbers in a proportion for a given situation (e.g., If there are 11 girls in a group and 6 boys and the question is what is the ratio of boys to girls then the ratio is 6:11 because the words had boys first).

Representation:

- Create a table showing equivalent ratios based on a given ratio.

Inches of snow	hours
2	1
4	2
6	?
?	4

- Vocabulary
  - ratio (e.g., 2:1, 1:1)
- percent

Suggested Instructional Strategies:

- When looking at a table, identify the pattern in each column.
- Teach explicitly how to problem solve for proportional relationships:
  - Use real-life contexts such as recipes, piano keys (black to white); provide real life objects.
  - Draw pictures and use tables to determine ratios.
  - Scale up the ratio (e.g., 2:3) in fraction form (2/3) to another denominator (x/6).
- Using proportional reasoning (e.g., 6 cups of flour is 2 X 3 (flour), so I can multiply 2x1 (sugar) to find the number of cups of sugar given that the original proportion is 3 cups flour to one cup sugar).

Suggested Supports and Scaffolds:

- Calculator
- Table of values
- Counters or cubes
- Graphic organizers
- Use real-life contexts such as recipes, piano keys (black to white) that are relevant to students.
- Draw pictures and use tables to determine proportions.

Louisiana Student Standard

- **7.RP.A.2** Recognize and represent proportional relationships between quantities.
  a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
  b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
  c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.*
  d. Explain what a point (*x*, *y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*) where *r* is the unit rate.

Louisiana Connector

- **LC.7.RP.A.2a** Identify the proportional relationship between two quantities.

Concrete Understandings:

- Recognize the constancy of one object to its parts (i.e., one face: two eyes).
- Recognize the meaning of the placement of numbers in a proportion for a given situation.
- Represent the proportion of objects (e.g., red hats) to the total number of objects (red and green hats).
- Identify the proportional relationship using visuals.

What is the proportional relationship below?

8:3 1:2 25:3

Representation:

- Recognize the meaning of the placement of numbers in a proportion for a given situation.
- Represent the proportion of objects (e.g., female students) to the total number of objects (students in class) (part-to-whole).
- Represent the proportion of the number of one object (female students) to the number of other objects (male students) from a set of objects (male and female students) (part-to-part).
- Find a percent of a quantity as a rate per 100 (e.g., 20% of a quantity means 20/100 or .20 times the quantity).
- Understand the following concept, symbols, and vocabulary: proportion, ratio, rate, prices, portions per person.

Suggested Instructional Strategies:

- Multiple Exemplar Training
  - Example: There are three chairs for one/each table. The ratio is **3 to 1**. The ratio is **3:1**. The ratio is **3/1.** The ratio is not **1 to 3.** Show me the proportion/ratio for three chairs for one table.
- Teach explicitly three ways to represent a proportion.
- Teach explicitly how to problem solve for proportional relationships:
  - Use real life contexts such as recipes, piano keys (black to white); provide real-life objects.
  - Draw pictures and use tables to determine ratios.
  - Scale up the ratio (e.g., 2:3) in fraction form (2/3) to another denominator (x/6).
  - Using proportional reasoning (e.g., 6 cups of flour is 2 X 3 (flour), so I can multiply 2x1 (sugar) to find the number of cups of sugar given that the original proportion is 3 cups flour to one cup sugar).
- Provide a ratio and ask the student to use unit blocks to show the ratio (e.g., the ratio of girls to boys in our class is 3:2. Use the unit blocks to show the ratio of girls to boys.).
- Teach explicitly how to recognize what a proportional relationship looks like and a representation that describes the situation.

Suggested Supports and Scaffolds:

- Use real-life contexts such as recipes and piano keys (black to white) that are relevant to students.
- Draw pictures and use tables to determine proportions.
- Unit blocks
- Graphs, tables, equations, diagrams, and tables to show ratio
- Assistive Technology

Louisiana Student Standard

- **6.RP.A.1** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*

Louisiana Connector

- **LC.7.RP.A.2b** Determine if two quantities are in a proportional relationship using a table of equivalent ratios or points graphed on a coordinate plane.

Concrete Understandings:

- Recognize the meaning of the placement of numbers in a proportion for a given situation.
- Represent the proportion of a subgroup of objects (e.g., red hats) to the total number of objects (red and green hats).
- Use a table with visuals or objects to represent proportions to determine if two numbers (i.e., 10:1) are the same proportional relationship as previous numbers (2:1, and 4:2).

Inches of snow	hours
2 	1 
4 	2 
10 	1 

- Use counters or objects to demonstrate a proportion.
- Generate a graph of values that are proportional.
- Teach skill using a variety of context (e.g., measurement, prices, pizza slices per person).

Representation:

- Know the following vocabulary: ratio (e.g., 2:1, 1:1), equivalent, coordinate plane

Suggested Instructional Strategies:

- Explicit instruction on rules for rounding using a number line
- Task analysis for rounding (e.g., circle place value, arrow next number, arrow number tells circle number what to do, make decision, enter answer)
- Model-Lead-Test

Suggested Supports and Scaffolds:

- Calculator
- Assistive Technology
- Interactive whiteboard
- Computer software
- Real world/meaningful context

Louisiana Student Standard

- **4.NF.B.3** Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. *Example: 3/4 = 1/4 + 1/4 + 1/4*.

b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples:* $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2\ 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.

Louisiana Connector

- **LC.4.NF.B.3b** Add and subtract fractions with like denominators of (2, 3, 4, or 8).

Concrete Understandings:

- Differentiate between parts of a fraction and the whole.
- Count the parts represented by the numerator.
- Recognize like denominators (e.g., recognize that the '4' in 2/4 is the same as the '4' in 1/4).
- Create a pictorial or concrete representation (using fraction strips or tiles) of fractions.
- Determine whether to use addition and subtraction strategies based on the context of the problem.

Representation:

- Understand the components of a fraction (numerator and denominator).
- Find the sum of two numbers.
- Vocabulary: numerator, denominator

Suggested Instructional Strategies:

- Model-Lead-Test
- Teach explicit rules for adding and subtracting fractions.
- Pizza Fractions: Cut 'pizza' circles the same size then cut them into a variety of fractions and use them to add/subtract mixed numbered fractions (e.g., add one half pizza to two 1/4 pieces to make a whole or subtract 1/3 pizza from 6/6).

Suggested Supports and Scaffolds:

- Fraction strips
- Fraction tiles
- Pictorial representations where the wholes are the same size
- Calculator
- Assistive Technology
- Interactive whiteboard
- Computer software
- Pattern blocks or sets of objects

Louisiana Student Standard

- **5.NBT.B.7** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; justify the reasoning used with a written explanation.

Louisiana Connector

- **LC.5.NBT.B.7** Solve 1 step problems using decimals.

Concrete Understandings:

- Given a real-world context, determine when to add, subtract, multiply, and divide.
- Understand that numbers to the right of the decimal represent a value less than one.
- Follow rules for decimal point placement when adding, subtracting, multiplying, or dividing.

Representation:

- Understand symbols for +, -, ×, ÷
- Know the following vocabulary: decimal point, decimal.

Suggested Instructional Strategies:

- Teach problem solving strategies to determine operations**.**
- Use task analytic instruction to teach steps to solve word problems.
- Teach using Least to Most prompts
- Use Model-Lead-Test
- Have students self-check their answers. Start by modeling this process.
- To demonstrate addition, gather several representations labeled with the decimal (circles, squares, pattern blocks, Cuisenaire rods) and identify how many of the pieces make one whole (e.g., .5 + .5).

Suggested Supports and Scaffolds:

- 10x10 hundreds grids
- Place value chart
- Calculator
- Assistive Technology
- Interactive whiteboard

- Computer software

Louisiana Student Standard

- **5.NBT.A.2** Explain and apply patterns in the number of zeros of the product when multiplying a number by powers of 10. Explain and apply patterns in the values of the digits in the product or the quotient, when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. *For example, $10^0 = 1$, $10^1 = 10$ ... and $2.1 \times 10^2 = 210$.*
- **6.EE.A.1** Write and evaluate numerical expressions involving whole-number exponents.

Louisiana Connector

- **LC.6.EE.A.1a** Identify what an exponent represents (e.g., $8^3 = 8 \times 8 \times 8$).

Concrete Understandings:

- Produce the correct amount of base numbers to be multiplied given a graphic organizer or template.
- Recognize that a number with an exponent means that the base is multiplied repeatedly the number of times equal to the exponent.

Representation:

- Select the correct expanded form of what an exponent represents (e.g., $8^3=8x8x8$).
- Identify the number of times the base number will be multiplied based on the exponent.
- Understand the following concepts, symbols, and vocabulary: base number, exponent

Suggested Instructional Strategies:

- Create diagram or number tree
- Task analysis
  - Identify the exponent of a number
  - Identify the number
- Write the number, the number of times indicated by the exponent

Suggested Supports and Scaffolds:

- Circle or highlight the raised number (exponent)
- Graphic organizer

Louisiana Student Standard

- **6.NS.A.1** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for* $(2/3) \div (3/4)$ *and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that* $(2/3) \div (3/4) = 8/9$ *because* $3/4$ *of* $8/9$ *is* $2/3$. *(In general,* $(a/b) \div (c/d) = ad/bc$.*) How much chocolate will each person get if 3 people share* $1/2$ *lb of chocolate equally? How many* $3/4$*-cup servings are in* $2/3$ *of a cup of yogurt? How wide is a rectangular strip of land with length* $3/4$ *mi and area* $1/2$ *square mi?*
- **6.NS.B.3** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Louisiana Connector

- **LC.6.NS.B.3** Solve one step, addition, subtraction, multiplication, or division problems with fractions or decimals.

Concrete Understandings:

- Understand and apply the concept of addition, subtraction, multiplication and division.
- Identify a fraction and decimal.
- Given a context, choose the correct operation (e.g., altogether, take away).

Representation:

- Relates fractions and decimals to pictorial representations.
- Understand the following symbols, concepts and vocabulary: +, -, ×, ÷, fraction and decimal (*a/b, .a*).

Suggested Instructional Strategies:

- Use multiple exemplar training to teach part to whole.
- Task analysis
- Teach using Least Intrusive Prompts.
- Use Model-Lead-Test.
- Have students self-check their answers. Start by modeling this process.
- To demonstrate addition, gather several representations of halves (circles, squares, pattern blocks, Cuisenaire rods) and identify how many of the pieces make one whole. Discuss that adding one more half makes the sum bigger than the whole.
- Present fraction and decimal patterns. For example, the denominator stays the same and the numerator increases by 1. Ask the student to find the next number in the sequence.

Suggested Supports and Scaffolds:

- Provide meaningful manipulatives, counters and/or picture representations with symbol included.
- Templates with formulas
- Graphic organizers (e.g., place value table) for visual structure
- Number lines
- Conversion tables
- Smart board technology
- Fraction strips
- Number lines with tactile representations
- Assistive Technology
- Large print or Braille representations of symbols and vocabulary
- Teach using a real-world application or task

Louisiana Student Standard

- **7.NS.A.1** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
  e. Apply properties of operations as strategies to add and subtract rational numbers.
- **7.NS.A.3** Solve real-world and mathematical problems involving the four operations with rational numbers.

Louisiana Connector

- **LC.7.NS.A.3b** Solve two step addition, subtraction, multiplication, and division problems with fractions, decimals, or positive/negative numbers.

Concrete Understandings:

- Understand and apply the concept of addition, subtraction, multiplication, and division.
- Identify positive and negative numbers on a number line.
- Identify a fraction and decimal.
- Given a real-world context, select the correct operations (e.g., altogether, take away).

Representation:

- Locate relevant information within a word problem.
- Understand the following concepts, symbols and vocabulary: addition, subtraction, multiplication, division, positive/negative numbers, number line.

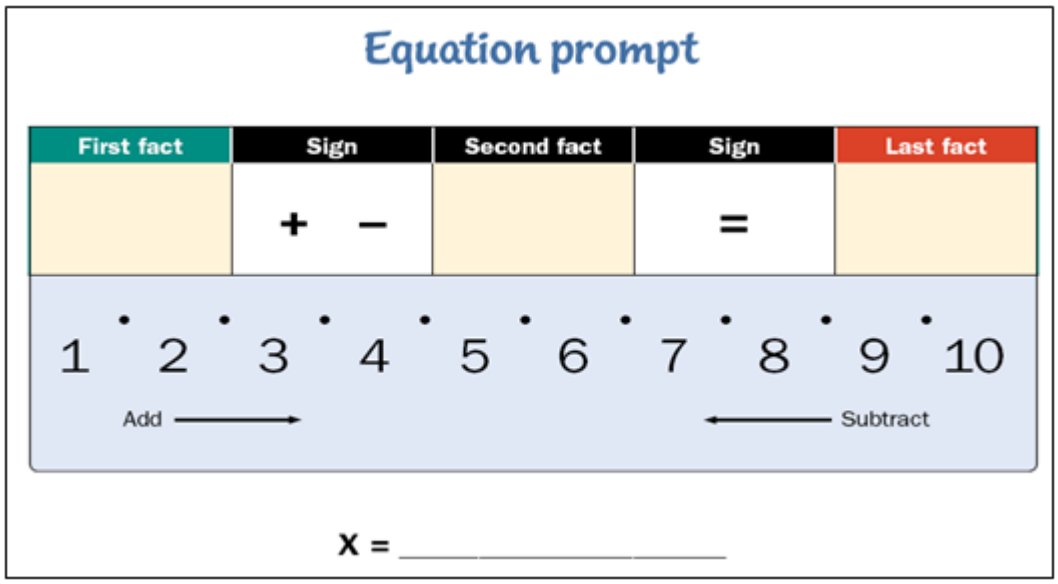
Suggested Instructional Strategies:

- Prime background knowledge and connections by using real-world context.
- Task analysis of steps to solve two-step word problems (this could include using Least Intrusive Prompts)
  - When solving word problems, teach how to determine which part of the problem is given and which part needs to be determined/solved
- Use Model-Lead-Test (This involves model solving a word problem while thinking out loud. For example, pointing out the key words and the operations they call for. For example, "To find the whole, we add. Then, to find a part, we subtract." Next follow the steps as a group with the teacher leading as needed. Last, give students an opportunity to complete the steps without help.)
- Teach explicitly the rules for solving problems involving computation providing templates/formulas

- Model addition/subtraction equations by placing the appropriate numbers of chips on a graphic organizer. Using the notion of opposites, demonstrate how to simplify by removing pairs of opposite colored chips.

Suggested Supports and Scaffolds:

- Highlight text using tape, pen, computer highlighting that provide important information
- Provide visual representations (e.g., grids) of problem with symbols
- Number line
- Labeled problem
- Use graphic organizers
- Conversion tables
- Calculator
- Use number lines to present a visual image for students to visualize addition and subtraction results.
- Provide two-colors of counters or colored chips as a physical and kinesthetic model for adding and subtracting integers. Let one color represent positives and the second color negatives.
- Assistive Technology



Louisiana Student Standard

- **7.RP.A.3** Use proportional relationships to solve multi-step ratio and percent problems of simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, and percent error.

Louisiana Connector

- **LC.7.RP.A.3d** Solve word problems involving ratios.
- **LC.6.RP.A.3h** Solve word problems involving ratios.

Concrete Understandings:

- Given a scenario, find the 2 quantities in a ratio (e.g., "Bill has traveled 460 miles on 10 gallons of gas. What is the ratio?" What is the unit of measure- gallons of gas, miles).
- Relate the placement of numbers in a ratio to the given context (the meaning of 46:1, 46 equals miles, 1 equals a gallon of gas).
- Use a table with visuals or objects to represent proportions to solve ratio problem.

Inches of snow	hours
2 	1 
4 	2 
10 	1 

Representation:

- Locate relevant information within a word problem.
- Make sense of a word problem to create a proportion.
- Understand the following concepts and vocabulary: ratio, proportion, rate.

Suggested Instructional Strategies:

- Help students access background knowledge and connections by using real world context.
- Task analysis of steps to solve word problems (this could include using Least Intrusive Prompts)
  - When solving word problems, teach how to determine which part of the problem is given and which part needs to be determined/solved.
- Use Model-Lead-Test
- Teach explicitly the rules for solving problems involving ratios providing templates/formulas.

- Use multiple exemplar training.
- Task Analysis example:
  - Read the story problem/situation: "In one (1) day, Jack eats three meals. How many meals will Jack eat in 5 days?
  - Use the information to label two rows in a table. Find the word/picture that follows the number. Write the first word/picture in the first row/ column (point to the row/column).
  - Write the second word/picture in the second row/first column (point to the row/column).
  - Use the information in the problem/situation to fill in the number of days (a).
  - Use the information in the problem/situation to fill in the number of meals (b).
  - Determine the relationship between "a" and "b" (a x __ = b)

Day (a)	1 2 3 4 5
Total Meals (b)	3 6 9 __ __

  -
  - Here is a way to show the ratio / compare the two numbers. The first row is a and the second row is b (a/<u>b</u>, 5/b, 5/15).

You showed the ratio of days to meals. Show/tell me the ratio.

Suggested Supports and Scaffolds:

- Highlight text that provide important information.
- Provide visual representations (e.g., grids) of problem with symbols.
- Tables (vertical or horizontal) with two labeled columns/rows to illustrate the ratio (e.g., Maria stamps three letters every minute which we write as 3:1. Show me the letters she stamps in a minute.).

Stamps	Minutes
3	1
__	2
__	3

- Voice output devices or talking software
- Calculator
- Labeled problem
- Conversion table
- Use graphic organizers
- Assistive Technology
- Highlight text using tape, pen, computer highlighting