Name ____________________________ Period __________ Date _____________

6-3
STUDENT PACKET

MATHLINKS: GRADE 6
STUDENT PACKET 3
FRACTION CONCEPTS

WORD BANK

Word or Phrase	Definition or Description	Example or Picture
area model for fractions		
benchmark fraction		
denominator		
equivalent fractions		
fraction		
inequality		
linear model for fractions		
numerator		
multiplication property of 1		
unit fraction		

FRACTION STRIPS

Summary

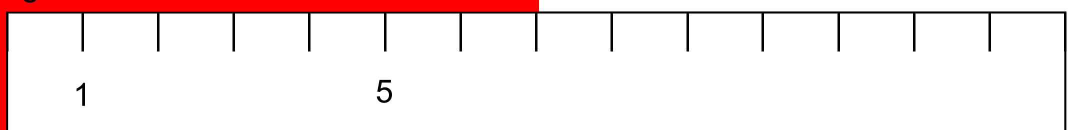
We will use a linear model to explore fraction equivalence. We will use sense-making strategies to order fractions. We will read and measure with a ruler. We will identify improper fractions and mixed numbers on a number line.

Goals

- Use a linear model to explore fraction concepts and equivalence.
- Use sense-making strategies to compare and order fractions.
- Read and measure with a ruler to the nearest eighth of an inch.

Warmup

1. Label centimeters on this ruler. Include 0 centimeters at the left edge. What goes on the right edge?



Use the ruler to answer the questions. Write a numerical equation to represent each answer.

2. What is the sum of 5 centimeters and 3 centimeters?

3. What is the difference of 9 centimeters and 4 centimeters?

4. How long is 3 groups of 4 centimeters?

5. How many groups of 2 centimeters are in 8 centimeters?

6. What fraction of 10 centimeters is 2 centimeters?

7. In this lesson you will see "the big one" used as a reminder of fractions that are equal to 1.

   One example is: $\frac{4}{4}$. Write three more fractions with a value of 1.

8. What is the result when a number is multiplied by 1?

9. What is the result when a number is divided by 1?

HALVES, FOURTHS, AND EIGHTHS WITH STRIPS

Your teacher will provide you with blank fraction strips. Make the following strips, label them like a ruler with fractions underneath markings, and write an explanation for how you made each strip.

1. fourths $\frac{0}{4}$ Explanation:	2. eighths Explanation:

3. Write inequalities to compare the unit fractions $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$.

$$\boxed{\frac{\quad}{\quad}} < \boxed{\frac{\quad}{\quad}} < \boxed{\frac{\quad}{\quad}}$$

4. Write fractions with denominators of 2, 4, and 8 that are equivalent to 1.

$$1 = \frac{\quad}{2} = \frac{\quad}{4} = \frac{\quad}{8}$$

5. Use the "big 1" to write fractions that are equivalent to $\frac{1}{2}$.

$$\frac{1}{2} \cdot \frac{\quad}{\quad} = \frac{\quad}{4} \qquad \text{and} \qquad \frac{1}{2} \cdot \frac{\quad}{\quad} = \frac{\boxed{\quad}}{8}$$

6. Write a fraction with a denominator of 8 that is equivalent to $\frac{3}{4}$.

$$\frac{3}{4} \cdot \frac{\quad}{\quad} = \frac{\quad}{8}$$

7. Describe how halves, fourths, and eighths are related.

OTHER FRACTIONS WITH STRIPS

Your teacher will provide you with blank fraction strips. Make the following strips, label them appropriately, and write an explanation for how you made each strip.

1. thirds Explanation:	2. sixths Explanation:

3. Write inequalities to compare the unit fractions: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, and $\frac{1}{8}$.

$$\frac{\square}{\square} < \frac{\square}{\square} < \frac{\square}{\square} < \frac{\square}{\square} < \frac{\square}{\square}$$

4. If two positive fractions both have a numerator equal to 1 (unit fractions), how can you tell which fraction has the larger value?

5. Write inequalities to compare these fractions: $\frac{3}{8}$, $\frac{3}{4}$, $\frac{3}{6}$, and $\frac{3}{3}$.

$$\frac{\square}{\square} < \frac{\square}{\square} < \frac{\square}{\square} < \frac{\square}{\square}$$

6. If two fractions have the same numerator, how can you tell which fraction has the larger value?

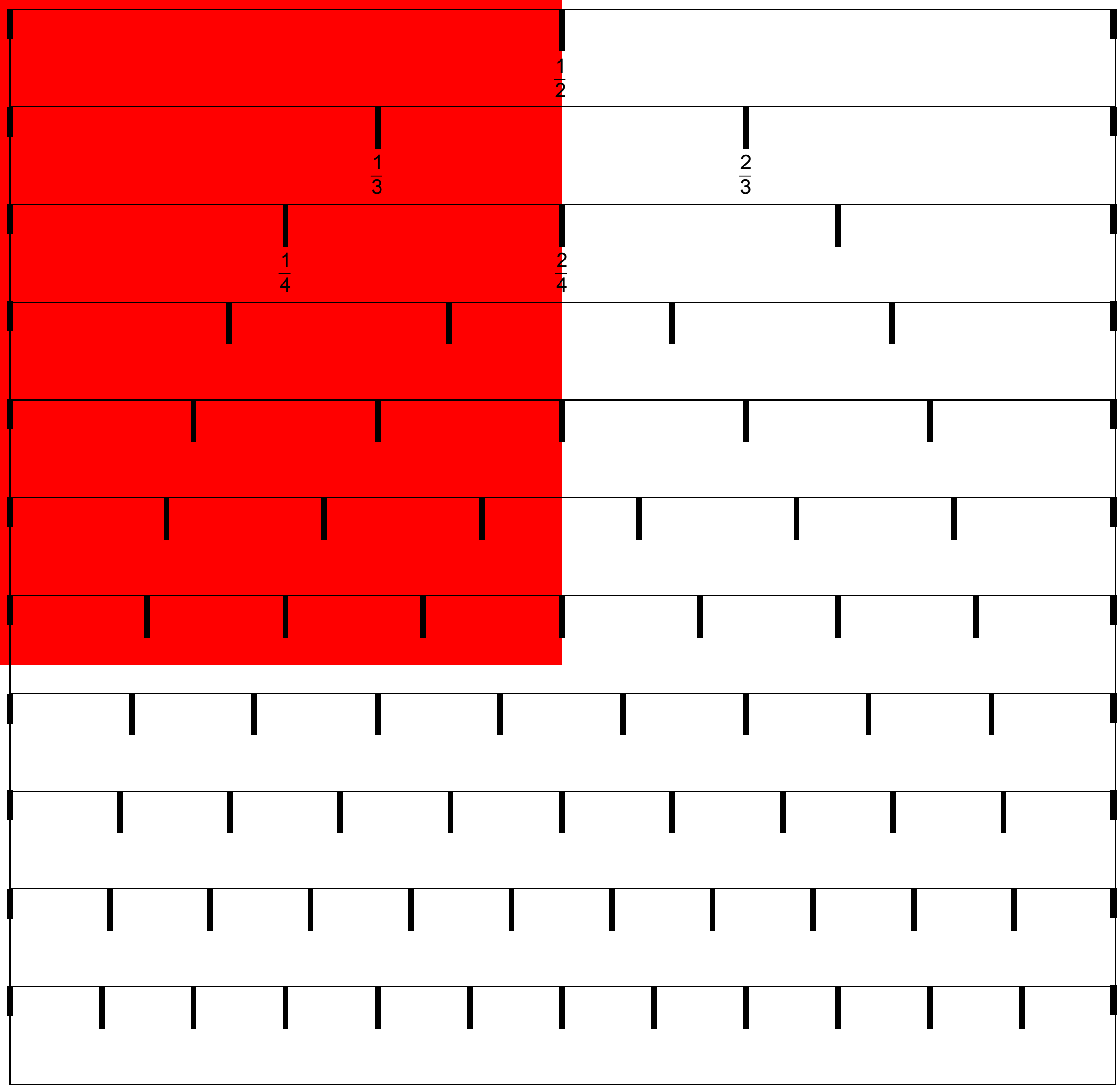
7. Write inequalities to compare these fractions: $\frac{5}{6}$, $\frac{1}{6}$, $\frac{6}{6}$, and $\frac{3}{6}$

$$\frac{\square}{\square} < \frac{\square}{\square} < \frac{\square}{\square} < \frac{\square}{\square}$$

8. If two fractions have the same denominator, how can you tell which fraction has the larger value?

EQUIVALENCE WITH A FRACTION ARRAY

1. Arrange your fraction strips to make a rectangle as shown. Write in fractions to make a fraction array.



2. Lightly shade the areas that represent $\frac{1}{3}$, $\frac{2}{6}$, $\frac{3}{9}$, and $\frac{4}{12}$. What does the shading tell you about these fractions?

3. Explain how you can tell from the fraction array if fractions are equivalent.

EQUIVALENCE WITH A FRACTION ARRAY (Continued)

4. Write three fractions that are equivalent to 0. What is the same about each of these fractions?

5. Write three fractions that are equivalent to 1. What is the same about each of these fractions?

6. Write two fractions that are equivalent to $\frac{3}{4}$. Use the "big 1" to prove they are equivalent.

7. Write three fractions that are equivalent to $\frac{1}{2}$. What is the relationship between the numerator and denominator in each of these fractions?

8. We say that the fraction $\frac{1}{2}$ is in simplest form, while the other three you wrote above are not. Write in your own words what you think it means for a fraction to be in simplest form.

9. Here are the fractions for twelfths. First circle all the twelfths that are in simplest form. Then rewrite the others in simplest form.

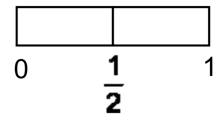
$\frac{0}{12}$ $\frac{1}{12}$ $\frac{2}{12}$ $\frac{3}{12}$ $\frac{4}{12}$ $\frac{5}{12}$ $\frac{6}{12}$

$\frac{7}{12}$ $\frac{8}{12}$ $\frac{9}{12}$ $\frac{10}{12}$ $\frac{11}{12}$ $\frac{12}{12}$

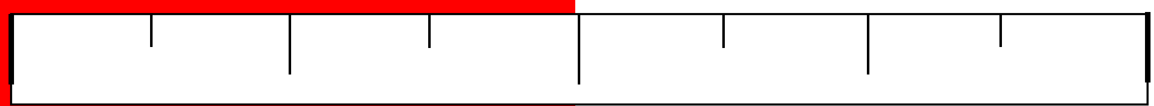
A CUSTOMARY RULER

In the United States, we often measure lengths in inches, feet, yards, and miles. The Greeks used the width of 16 fingers to find one foot. The Romans adopted the foot from the Greeks and divided it into 12 sections. You may be used to using a one-foot ruler, which is divided into 12 inches.

A measurement of about one inch of length is pictured to the right.



Pictured below is an enlarged, or magnified inch.



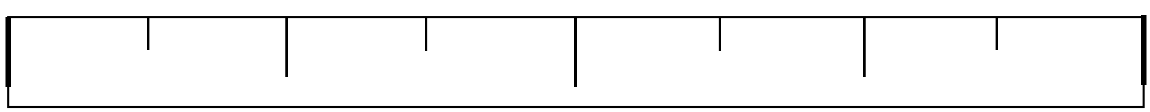
1. The enlarged inch above is divided into _______ equal parts.
2. Write the fractional amount for each part under its marking.
3. Write three pairs of equivalent fractions that relate to these markings.

Example: $\frac{4}{8}=\frac{1}{2}$ ____ = ____ ____ = ____ ____ = ____

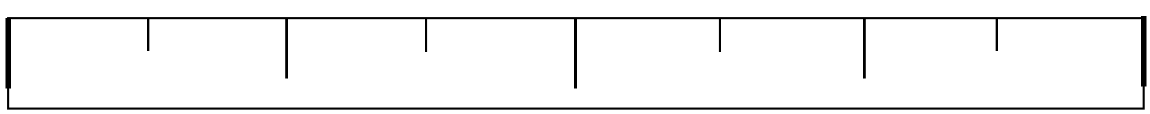
> A <u>proper fraction</u> is a fraction between zero and 1.
>
> A <u>mixed number</u> is the sum of a whole number and a fraction.

Portions of enlarged rulers are shown below. Use mixed numbers to label each marking.

4.

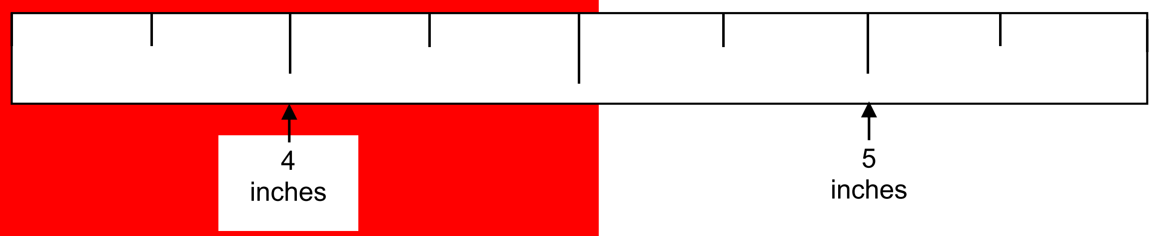


5.

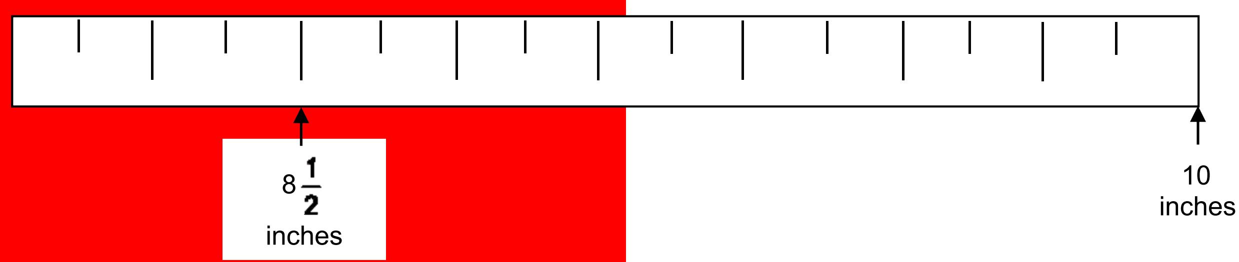


A CUSTOMARY RULER (Continued)

6.



7.



Use a ruler to measure each length below to the nearest eighth of an inch.

8.

9.

10.

11.

12. What are the dimensions of a page in this packet? __________ by __________

Use a ruler to draw a line segment of each length below.

13. $3\frac{1}{2}$ in.

14. $4\frac{3}{4}$ in.

15. $1\frac{1}{8}$ in.

16. $5\frac{5}{8}$ in.

ORDERING FRACTIONS ON A NUMBER LINE

Summary	Goals
We will use sense-making strategies to order fractions on a number line.	• Use sense-making strategies to compare and order fractions. • Identify unit fractions. • Use benchmark fractions to locate other fractions on a number line.

Warmup

Unit Fractions	$\frac{1}{3}$	$\frac{1}{9}$	$\frac{1}{4}$	$\frac{1}{15}$
NOT Unit Fractions	$\frac{2}{3}$	$\frac{5}{9}$	$\frac{7}{4}$	$3\frac{1}{15}$

1. Give three more examples of unit fractions.

2. Give three more examples of fractions that are NOT unit fractions.

3. What is a unit fraction? Explain in your own words.

STRATEGIES FOR ORDERING FRACTIONS

Order the fractions. For problems 1-5, use the word list below to name each strategy. Then describe a general strategy for comparing the fractions within each group.

	Fractions	Ordering Strategy
1.	$\frac{1}{8}, \frac{1}{4}, \frac{1}{5}$ ______ < ______ < ______	These are called ____________ fractions. Describe a sense making strategy for comparing these kinds of fractions.
2.	$\frac{3}{5}, \frac{3}{4}, \frac{3}{8}$ ______ < ______ < ______	These fractions all have a common ___________________. Use your strategy from problem 1 to describe a sense-making strategy for comparing these kinds of fractions.
3.	$\frac{3}{12}, \frac{1}{12}, \frac{8}{12}$ ______ < ______ < ______	These fractions all have a common ___________________. Describe a sense-making strategy for comparing these kinds of fractions.
4.	$\frac{7}{8}, \frac{3}{4}, \frac{4}{5}$ ______ < ______ < ______	These fractions are all ______________ minus a unit fraction. Use your strategy from problem 1 to describe a sense-making strategy for comparing these kinds of fractions.
5.	$\frac{17}{25}, \frac{3}{10}, \frac{4}{8}$ ______ < ______ < ______	Simplify $\frac{4}{8} \rightarrow \boxed{\frac{\quad}{\quad}}$. This is called a(n) ____________ fraction because it is easily recognizable. Describe a sense-making strategy for comparing other fractions to this fraction.

Word List				
numerator	denominator	benchmark	unit	one

NUMBER LINE A

Estimate the location of each number on the number line:

$0 \qquad 1 \qquad \frac{1}{2} \qquad \frac{1}{4} \qquad \frac{6}{8} \qquad \frac{6}{10} \qquad \frac{6}{7} \qquad \frac{7}{8}$

1. What benchmark fractions did you locate on your number line?

2. Explain how you located $\frac{6}{8}$ on the number line.

3. Explain how you located $\frac{6}{7}$ and $\frac{7}{8}$ on the number line.

NUMBER LINE B

Estimate the location of each number on the number line:

0 $\quad 1 \quad \frac{3}{4} \quad \frac{3}{7} \quad \frac{3}{9} \quad \frac{1}{6} \quad \frac{16}{20} \quad \frac{17}{21}$

1. What benchmark fractions did you locate on your number line?

2. Explain how you located $\frac{3}{7}$ and $\frac{3}{9}$ on the number line.

3. Explain how you located $\frac{16}{20}$ and $\frac{17}{21}$ on the number line.

NUMBER LINE C

Estimate the location of each number on the number line:

$\frac{1}{2}$ $\frac{1}{8}$ $\frac{3}{5}$ $\frac{13}{14}$ $\frac{2}{5}$ $\frac{10}{12}$

1. What benchmark fractions did you locate on your number line?

2. Explain how you located $\frac{2}{5}$ and $\frac{3}{5}$ on the number line.

3. Explain how you located $\frac{10}{12}$ and $\frac{13}{14}$ on the number line.

ORDER IT!

Play this game with a partner.

Need:

- 2 or more players
- 32 or more Fraction Cards

The object of this game is to get five numbers in a row, in order, from least value to greatest value. Once a card is placed on the table face up, it may not be moved to another location. However, a new card may be placed on top of it.

- Shuffle all the cards and place the cards face down in a pile.
- To begin, put 5 cards face-up, in the order they are drawn.
- The first player draws a card from the pile and places it <u>on top of</u> one of the existing face-up cards. If all of the cards are now in order from least to greatest, then the player wins. If not, then play continues until all five cards are in order from least to greatest.
- The next player draws a card from the pile and places it <u>on top of</u> one of the existing face-up cards. If all the cards are now in order from least to greatest, then the player wins. If not, then play continues until all five cards are in order from least to greatest.

In order to win, player must convince his or her opponents with a reasonable argument that the cards are in order.

1. Play two rounds of Order It! Record one of the ordered card sequences here.

   __________ __________ __________ __________ __________

2. Explain how you know the numbers are in order.

RENAMING FRACTIONS

Summary	Goals
We will represent fractions greater than one as mixed numbers and as improper fractions using an area model, a set model, and a linear model. We will explore how mixed numbers are used on a ruler that is marked in inches.	• Represent fractions greater than 1 as mixed numbers and improper fractions. • Convert mixed numbers to improper fractions and vice-versa. • Link a customary measurement unit (inches) to mixed numbers.

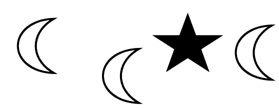
Warmup

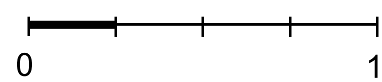
Match each model for illustrating fractions to its example.

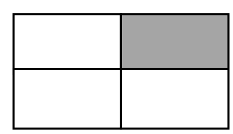
___1. Linear model ($\frac{1}{4}$ of the length is **bold**)

___2. Area Model ($\frac{1}{4}$ of the big rectangle is shaded)

___3. Set model ($\frac{1}{4}$ of the shapes are stars)

A. 

B. 

C. 

Interpret the meaning of the numerator and denominator for each model.

	Model	Meaning of the numerator	Meaning of the denominator
4.	Linear model		
5.	Area model		
6.	Set model		

MIXED NUMBERS AND IMPROPER FRACTIONS

A <u>proper fraction</u> is a fraction that is greater than zero and less than 1.

An <u>improper fraction</u> is a fraction greater than or equal to 1.

A <u>mixed number</u> is the sum of a whole number and a proper fraction.

Circle the word that correctly identifies each number below.

1. $\frac{3}{8}$ proper fraction / improper fraction / mixed number	2. $\frac{11}{2}$ proper fraction / improper fraction / mixed number	3. $2\frac{5}{11}$ proper fraction / improper fraction / mixed number
4. $1\frac{3}{8}$ proper fraction / improper fraction / mixed number	5. $\frac{11}{11}$ proper fraction / improper fraction / mixed number	6. $\frac{27}{11}$ proper fraction / improper fraction / mixed number

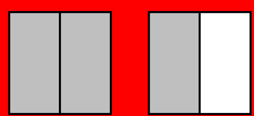
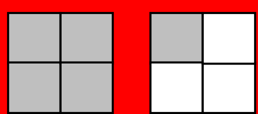
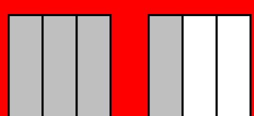
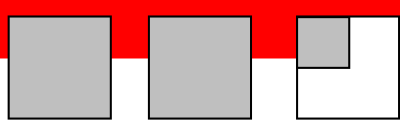
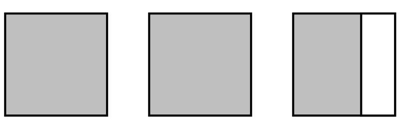
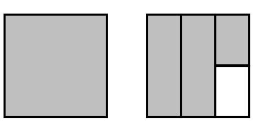
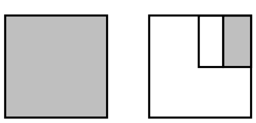
Complete the table. Each rectangle below represents one whole cracker.

Amount in words	Shade the appropriate amount (there may be extra squares)	Write the number
7. One-half of a cracker	☐ ☐ ☐ ☐	
8. One and one-half crackers	☐ ☐ ☐ ☐	
9. Two and one-half crackers	☐ ☐ ☐ ☐	
10. Three-halves crackers	☐ ☐ ☐ ☐	

11. Which word descriptions represent the same amount of crackers?

MIXED NUMBERS AND IMPROPER FRACTIONS (Continued)

Represent each picture with numerical expressions. Words are included in the example for interpretation, but you do not need to write each expression in words.

Shaded Crackers	Sum	Mixed Number	⟷ Conversion	Improper Fraction
Ex. 	$1 + \frac{1}{2}$ one plus one-half	$1\frac{1}{2}$ one and one-half	$\frac{2}{2} + \frac{1}{2}$ two halves plus one-half	$\frac{3}{2}$ three halves
11. 				
12. 				
13. 				
14. 				
15. 				
16. 				

17. Molly thinks that the mixed number represented in problem 15 above is $1\frac{3}{4}$ because 3 out of 4 parts of a whole are shaded. Critique Molly's reasoning.

RENAMING SHORTCUTS

1. Change $5\frac{7}{8}$ into an improper fraction: $5 = \frac{\square}{8}$

$$5\frac{7}{8} = \frac{\square}{8} + \frac{7}{8} = \frac{\square}{8}$$

2. Change $\frac{17}{3}$ into a mixed number $\frac{17}{3} = 17 \div 3 =$ _______ Remainder _______

$$\frac{17}{3} = \frac{\square}{3} + \frac{2}{3} = \boxed{} + \boxed{\frac{}{}} \quad =$$

A shortcut for renaming mixed numbers and improper fractions is illustrated here.

To find the number of *eighths*,

$$\times \quad 5\,\frac{7}{8} \quad +$$

$5 \times 8 = 40$ $40 + 7 = 47$ $= 5\frac{7}{8} = \frac{40}{8} + \frac{7}{8} = \frac{\square}{8}$

(40 *eighths*) (47 *eighths*)

Change each mixed number into an improper fraction.

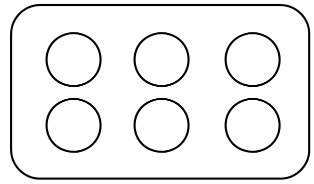
3. $4\frac{3}{5}$	4. $2\frac{1}{6}$	5. $8\frac{3}{7}$

Change each improper fraction into a mixed number.

6. $\frac{8}{3}$	7. $\frac{23}{4}$	8. $\frac{42}{9}$

9. Piedmont said that $2\frac{3}{8}$ is equal to $\frac{19}{8}$ because 2 is equal to 16 eighths and three more eighths makes 19 eighths. Critique Piedmont's reasoning.

MUFFIN PROBLEMS



The diagram to the right represents one whole pack of muffins.

1. Shade $\frac{1}{2}$ of the pack.

2. Draw sketches to represent the following:

Number of packs of muffins	$\frac{3}{2}$ packs	$1\frac{1}{6}$ packs	$1\frac{2}{3}$ packs
Sketch	a.	b	c.

3. If 3 muffins represent three-fourths of a pack of muffins, draw sketches to represent the following.

Number of packs of muffins	1 whole pack	$1\frac{1}{2}$ packs	$\frac{9}{8}$ packs
Sketch	a.	b.	c.

COMPARING FRACTIONS AND MIXED NUMBERS

Rewrite each measurement as an improper fraction.

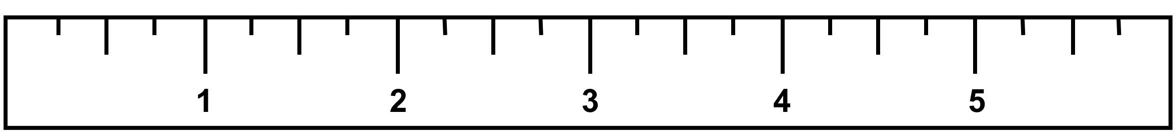
1. $1\frac{3}{4}$ in.	2. $1\frac{5}{8}$ in.	3. $4\frac{3}{8}$ in.	4. $4\frac{1}{4}$ in.

Rewrite each measurement as a mixed number.

5. $\frac{5}{2}$ in.	6. $\frac{17}{2}$ in.	7. $\frac{44}{8}$ in.	8. $\frac{20}{4}$ in.

Locate each length on a ruler. Then use the symbols <, =, or > to order each pair of lengths.

9. $\frac{7}{2}$ inches ____ $2\frac{7}{8}$ inches	10. $\frac{8}{4}$ inches ____ $\frac{7}{2}$ inches	11. $\frac{12}{8}$ inches ____ $1\frac{1}{4}$ inches
12. $4\frac{5}{8}$ inches ____ $\frac{25}{8}$ inches	13. $\frac{18}{4}$ inches ____ $5\frac{3}{4}$ inches	14. $\frac{13}{2}$ inches ____ $1\frac{5}{8}$ inches



POSTER PROBLEMS 1

Part 1: Your teacher will divide you into groups.

- Identify members of your group as A, B, C, or D. I am group member _______.
- Each group will start at a numbered poster. Our group start poster is _______.
- Each group will have a different color marker. Our group marker is _________.

Part 2: Answer the problems on posters by following the directions of your teacher.

Part 3: Return to your seats.

Our group started at poster _____. Refer to this poster.

Now you get to be the in the role of the "teacher."

1. "Create an answer key." In other words, place the four numbers on a number line, explain how you determined the scale, and describe the strategies used to order them.

2. "Grade the paper." In other words, review the work on the poster, indicate whether the various responses are correct or not, critique the reasoning on the poster, and provide suggestions for improvement.

SKILL BUILDERS, VOCABULARY, AND REVIEW

SKILL BUILDER 1

1. Use an area model to multiply 431 by 23. Check using another method.

Solution:	Check:

2. Use the alternative division algorithm below. Check your answer using an area model for multiplication.

$13\overline{)410}$

Check:

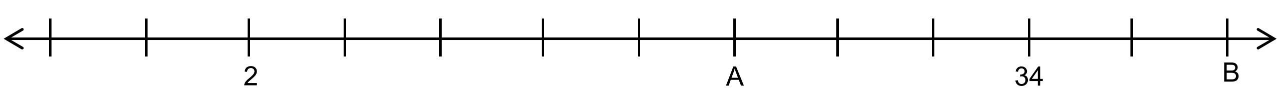
_____ = _____ • _____ + _____

(Dividend = Divisor • Quotient + Remainder)

Area model:

Toolkit:

3. Find the value of points A and B on the number line. All marks on the line are equally spaced. Clearly show calculations used to find your answers.



4. Rewrite the expression 17(46 + 54) using the distributive property. Explain whether the original expression or resulting expression is easier for you to calculate.

SKILL BUILDER 2

1. List all the factors of 28. ______________________________

2. List all the factors of 40. ______________________________

3. Circle all the factors that 28 and 40 have in common.

4. What is the greatest factor that 28 and 40 have in common?

5. Describe, in your own words, why the number you wrote for problem 4 is the greatest common factor of 28 and 40.

Use the process described above to find the GCF of each pair of numbers.

6. 70 and 49	7. 33 and 110

8. List the first ten multiples of 6. ______________________________

9. List the first ten multiples of 9. ______________________________

10. Circle all the multiples that 6 and 9 have in common.

11. What is the least multiple that 6 and 9 have in common?

12. Describe in your own words why the number you wrote for problem 11 is the least common multiple of 6 and 9.

Use the process described above to find the LCM of each pair of numbers.

13. 8 and 12	14. 4 and 14

15. $(2 \cdot 4) \cdot 9 = 2 \cdot (4 \cdot 9)$ illustrates the _______________ property of multiplication. Circle the expression that you think is easier to calculate and explain why.

SKILL BUILDER 3

1. Circle the equations below that are true. For those equations that are not true, explain why.

$6 + 3 = 3 + 6$ $\quad$ $4 + 0 = 4$ $\quad$ $4 \bullet 0 = 4$ $\quad$ $12 \div 4 = 4 \div 12$

Simplify the following expressions.

2. $(7 – 5)^2 + (3 – 1)$	3. $\dfrac{3+7}{3^2+1}$
4. $1^3 + 4^3$	5. $(1 + 4)^3$

6. Steve's bedroom measures 12 feet by 13 feet. Ricardo's bedroom measures 8 feet by 14 feet. Assuming that both bedrooms are rectangular, whose room has the greater area?

Place parentheses in the equations below so that each becomes a true statement. Use as many sets of parentheses as needed to make your work clear. Write “none needed” if the equation is already true.

7a. $2 + 4 \bullet 8 \div 4 = 10$	7b. $2 + 4 \bullet 8 \div 4 = 12$
8a. $2 + 4^2 \bullet 2 + 5 = 39$	8b. $2 + 4^2 \bullet 2 + 5 = 41$

SKILL BUILDER 4

Simplify each expression	List the operations in order from first to last
1. $\frac{14 - 2}{3 + 3}$	
2. $4 + 12 \div 4 - 3$	
3. $(4 + 12) \div 4 - 3$	
4. $(4 + 12) \div (4 - 3)$	

Place parentheses in the equations below so that each becomes a true statement. Use as many sets of parentheses as needed to make your work clear. Write "none needed" if the equation is already true.

5. $3 + 5^2 \div 7 = 4$

6. $14 = 16 - 3 + 1$

7. $3 + 2^3 = 125$

8. Tomas thinks that since $2 \cdot 3 = 3 \cdot 2$, then $2^3 = 3^2$. Critique Tomas's reasoning.

SKILL BUILDER 5

1. Write inequalities to compare the unit fractions $\frac{1}{5}$, $\frac{1}{3}$, $\frac{1}{7}$, and $\frac{1}{8}$.

   ___ < ___ < ___ < ___

2. Kris says, "If two fractions are unit fractions, then the fraction with the greater denominator has the lesser value." Is Kris's statement correct? Explain.

3. Write inequalities to compare these fractions: $\frac{5}{8}$, $\frac{5}{9}$, $\frac{5}{6}$, and $\frac{5}{5}$.

   ___ < ___ < ___ < ___

4. Does Kris's strategy (from problem 2) apply to all fractions that have "common numerators?" Explain.

5. Write inequalities to compare these fractions: $\frac{5}{7}$, $\frac{2}{7}$, $\frac{7}{7}$, and $\frac{3}{7}$.

   ___ < ___ < ___ < ___

6. Which of the fractions from problem 5 are less than $\frac{1}{2}$? Explain your reasoning for each.

SKILL BUILDER 6

1. Order the fractions from least to greatest.

$$\frac{1}{8} \qquad \frac{1}{5} \qquad \frac{1}{7} \qquad \frac{1}{4} \qquad \frac{1}{10}$$

________ ________ ________ ________ ________

2. Estimate the location of each number on the number line.

$$\frac{3}{4} \qquad \frac{3}{7} \qquad \frac{3}{9} \qquad \frac{1}{4} \qquad \frac{1}{3}$$

3. Explain how you located $\frac{3}{7}$ and $\frac{3}{9}$.

4. Carli thinks that $\frac{7}{8}$ is greater than $\frac{19}{20}$ because fractions with smaller denominators are bigger than fractions with larger denominators. Use examples or counter-examples to critique Carli's reasoning.

5. Write five different fractions that are equivalent to $\frac{1}{2}$.

SKILL BUILDER 7

Complete the table. Each square below represents one whole cracker.

Amount in words	Shade the appropriate amount (there may be extra squares)	Write the number
1. One-third of a cracker		
2. Two and one-third crackers		
3. Three and two-thirds crackers		
4. Seven-thirds crackers		

5. In problems 1-4 above, which fractions appear to be equivalent to each other? Explain.

Change each mixed number into an improper fraction.

6. $5\frac{2}{3}$	7. $1\frac{5}{6}$	8. $7\frac{1}{7}$

Change each improper fraction into a mixed number.

9. $\frac{3}{8}$	10. $\frac{9}{2}$	11. $\frac{18}{6}$

SKILL BUILDER 8

Rewrite each measurement as an improper fraction.

1. $1\frac{1}{4}$ in.	2. $1\frac{5}{8}$ in.	3. $7\frac{3}{8}$ in.	4. $11\frac{1}{2}$ in.

Rewrite each measurement as a mixed number.

5. $\frac{7}{2}$ in.	6. $\frac{18}{4}$ in.	7. $\frac{41}{4}$ in.	8. $\frac{91}{8}$ in.

Use the symbols <, =, or > to order each pair of lengths.

9. $\frac{15}{4}$ inches ____ $2\frac{7}{8}$ inches	10. $\frac{8}{4}$ inches ____ $\frac{16}{8}$ inches	11. $\frac{12}{8}$ inches ____ $1\frac{1}{4}$ inches
12. $4\frac{5}{8}$ inches ____ $\frac{65}{8}$ inches	13. $\frac{21}{4}$ inches ____ $5\frac{3}{4}$ inches	14. $\frac{13}{2}$ inches ____ $3\frac{1}{8}$ inches

Use a ruler to measure each line segment to the nearest eighth of an inch.

15. ______________________________

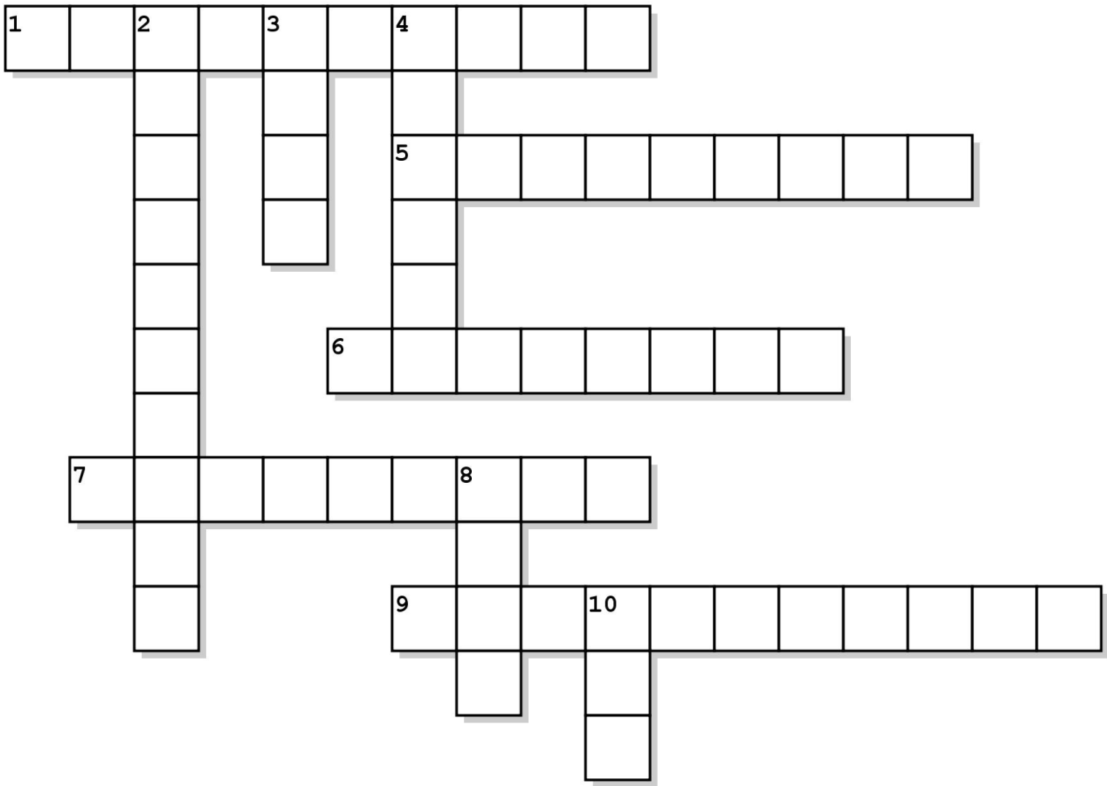
16. ___________________________

Use a ruler to draw each line segment.

17. $2\frac{1}{4}$ in.

18. $3\frac{3}{8}$ in.

FOCUS ON VOCABULARY



Across

1 A statement asserting one expression is less than another

5 The expression written above the line in a common fraction to indicate the number of parts of the whole

6 One of many points on the number line (e.g. $\frac{1}{4}$)

7 A fraction that is easily recognizable

9 The expression written below the line in a common fraction that indicates the number of parts into which one whole is divided

Down

2 Fractions that represent the same point on the number line

3 A fraction with numerator = 1.

4 A model for fractions on a number line

8 A model that represents fractions visually using figures in the plane

10 Multiplicative identity

(For word hints, see the word bank and other vocabulary used in this packet.)

SELECTED RESPONSE

Show your work on a separate sheet of paper.

1. Choose all sets of fractions that are written in order from least to greatest.

   A. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ B. $\frac{1}{4}, \frac{1}{3}, \frac{1}{2}$

   C. $\frac{1}{8}, \frac{3}{8}, \frac{5}{8}$ D. $\frac{5}{8}, \frac{3}{8}, \frac{1}{8}$

2. Choose all of the following fractions that are equivalent to $\frac{1}{4}$.

   A. $\frac{3}{4}$ B. $\frac{3}{12}$ C. $\frac{4}{12}$ D. $\frac{2}{8}$

3. Which of the following fractions best represents the value of A on the number line below?

   A. $\frac{1}{12}$ B. $\frac{1}{4}$ C. $\frac{1}{2}$ D. $\frac{2}{3}$

4. Lenora ate one apple on Monday, one on Tuesday, one on Wednesday, and then another half of an apple on Thursday. Choose all numbers that represent how many apples she ate.

   A. $\frac{3}{2}$ B. $3\frac{1}{2}$ C. $\frac{7}{2}$ D. $3\frac{3}{2}$

5. Choose all of the fractions that are equivalent to $\frac{17}{4}$.

   A. $17\frac{1}{4}$ B. $4\frac{3}{4}$ C. $4\frac{1}{4}$ D. None of these fractions are equivalent to $\frac{17}{4}$.

KNOWLEDGE CHECK

Show your work on a separate sheet of paper and write your answers on this page.

3.1 Fraction Strips

1. Arrange the following fractions from least to greatest.

   $\frac{12}{12}, \quad \frac{3}{12}, \quad \frac{5}{12}, \quad \frac{1}{12}, \quad \frac{7}{12}$

2. Arrange the following fractions from greatest to least.

   $\frac{3}{8}, \quad \frac{3}{12}, \quad \frac{3}{5}, \quad \frac{3}{4}, \quad \frac{3}{7}$

3. Use a ruler to measure the line segment below to the nearest eighth of an inch.

3.2 Ordering Fractions on a Number Line

4. Estimate the location of each number on the number line below.

   $\frac{2}{4} \qquad \frac{5}{7} \qquad \frac{4}{12} \qquad \frac{1}{4} \qquad \frac{2}{3}$

5. Explain how you located $\frac{5}{7}$ and $\frac{4}{12}$.

3.3 Renaming Fractions

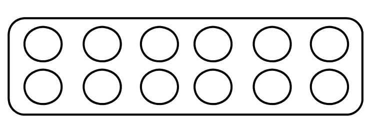
6. Rewrite $3\frac{2}{5}$ as an improper fraction.

7. Rewrite $\frac{24}{7}$ as a mixed number.

8. Pictured to the right are a dozen (12) eggs. Draw the following:

   a. $\frac{2}{3}$ of a dozen

   b. $1\frac{1}{2}$ dozen



HOME SCHOOL CONNECTION

1. Order these three fractions in order from least to greatest.

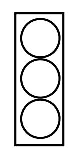
   $\frac{11}{24}$ $\frac{5}{8}$ $\frac{9}{18}$

2. For each of the three fractions above, write an equivalent fraction.

3. Estimate the location of each number on the number line:

   $\frac{1}{2}$ $\frac{1}{4}$ $\frac{3}{8}$ $\frac{12}{13}$ $\frac{8}{10}$ $\frac{15}{16}$

4. Golf balls frequently are sold in packages of three called sleeves(shown below). Draw $2\frac{2}{3}$ sleeves of golf balls. Then write this mixed number as an improper fraction.



Parent (or Guardian) Signature_______________________________

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COMMON CORE STATE STANDARDS – MATHEMATICS

STANDARDS FOR MATHEMATICAL CONTENT

3.NF.1*	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 $1/b$.
3.NF.2a*	Understand a fraction as a number on the number line; represent fractions on a number line diagram: 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.
3.NF.2b*	Understand a fraction as a number on the number line; represent fractions on a number line diagram: 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.
3.NF.3a*	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size: Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
3.NF.3b*	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size: 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.
3.NF.3c	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size: 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.
3.NF.3d*	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size: 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.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.
4.NF.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.

*Review of content essential for success in 6^{th} grade.

STANDARDS FOR MATHEMATICAL PRACTICE

MP2	Reason abstractly and quantitatively.
MP5	Use appropriate tools strategically.
MP7	Look for and make use of structure.
MP8	Look for and express regularity in repeated reasoning.

9 7 8 1 6 1 4 4 5 0 0 8 5