MTH 1W: Representing and Comparing Fractions

LESSON OVERVIEW:

Scope and Sequence – Main Lesson Topics	Prior Knowledge	Vocabulary
• Representing fractions and mixed numbers • Comparing fractions and mixed numbers • Positive and negative fractions and mixed numbers • Relating unit fractions to other fractions • Converting between improper fractions and mixed numbers • Simplifying fractions	• Mixed numbers • Unit fractions • Postitive and negative numbers • Simplify	• Represent • Compare • Convert

Learning Objectives

I will be able to:

- Represent fractions, so that I can compare and order them using different methods
- Identify unit fractions so that I can determine their relationship to other fractional amounts.
- Apply my knowledge of integers so that I can explain how positive and negative signs effect fractions

Curriculum Expectations

- **B3.2** apply an understanding of unit fractions and their relationship to other fractional amounts, in various contexts, including the use of measuring tools
- B3.3 apply an understanding of integers to explain the effects that positive and negative signs have on the values of ratios, rates, fractions, and decimals, in various contexts
- **B3.4** solve problems involving operations with positive and negative fractions and mixed numbers, including problems involving formulas, measurements, and linear relations, using technology when appropriate E1.3 Students will use a variety of measurement systems (from various cultures and communities), so that they can solve problems involving different units within and between measurement systems
- **E1.3** solve problems involving different units within a measurement system and between measurement systems, including those from various cultures or communities, using various representations and technology, when appropriate

1 Lesson Introduction & Problem String *(see below)* — 40 minutes

Introduction: This lesson reviews basic concepts for representing and comparing fractions

- Show two fractions with same denominator and different numerators – ask which is bigger? How do you know? How can you show it?
- Show two fractions with the same numerator and different denominators – as which is smaller? How do you know? How can you show it?
- Show several different fractions and ask students if the fractions is closer to 0, ½ or 1? How do they know? How can you show it?

See below for more ideas for representing and comparing

2 Consolidation — 10 minutes

3 Meaningful Notes — 10 minutes

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4 Check Your Understanding — 15 minutes

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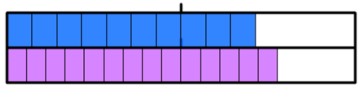
LESSON BACKGROUND:

Representing and Comparing Fractions

- **Models** – such as numberlines, fraction strips, bar models or area models. To compare $1\frac{3}{7}$ and $1\frac{5}{9}$ we can use a bar model like this one



We can see that $1\frac{3}{7} < 1\frac{5}{9}$

- **Benchmarks** – knowing benchmarks can help you to compare fractions. (I know that 3 is less than half of 7, so I know that $\frac{3}{7} < \frac{1}{2}$ I also know that 5 is more than half of 9, so $\frac{5}{9} > \frac{1}{2}$
- **Common Numerators** – If we compare $\frac{7}{11}$ *and* $\frac{7}{13}$ then we can see that we have the same number of pieces, but the size of each piece is different, so $\frac{7}{11} > \frac{7}{13}$
- **Equivalent Fractions** – when comparing $\frac{3}{11}$ *and* $\frac{6}{19}$ we might recognize that $\frac{6}{22} = \frac{3}{11}$ and then we can use common numerators to compare $\frac{6}{22} < \frac{6}{19}$
- **Using Unit Fractions** – When ordering fractions like $\frac{10}{11}$ *and* $\frac{12}{13}$ We can see that each fraction is 1 unit fraction away from the whole. Since thirteenths are smaller, there is less missing from the whole partitioned into thirteenths, so $\frac{12}{13} > \frac{10}{11}$
(Paying Attention to Fractions)

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PROBLEM	HINTS	EXTENSIONS
How might we represent one-quarter? Draw as many pictures as you can.	• What tools or models might you use to help you? • Can you represent one-quarter another way? • How many ways can you represent one-quarter?	• How many other fractions can we create that all mean *one-quarter*? • How many different numbers/fractions can we create using one-quarters? • Draw a rectangular grid on your board. If it represents one quarter of a whole. What might the whole look like? How do you know?
How many one-halves are in 2 ½?	• What information do you know? What is the question asking you? • Can you use a simpler problem? How many one-halves are in 1? • How might knowing how may one-halves are in one help you determine how many one-halves are in 2 ½? • What tools or models could you use to show 2 ½ visually?	• How else can we represent 2 ½ as a fraction?
Write the number $3\frac{1}{4}$ as an improper fraction.	• A visual representation might help! (You might want to try using a number line, a bar model or fraction strips) • What information do you know? What is the question asking you? • How many quarters are in one whole? How might knowing this help you to determine how many quarters are in $3\frac{1}{4}$ • How many one-quarters are in *three and one-quarter*?	• How does $3\frac{1}{4}$ compare to your answer? • Can you think of another strategy to help change a mixed number into improper?
Write the fraction $\frac{8}{5}$ as a mixed number.	• A visual representation might help! (You might want to try using a number line, a bar model or fraction strips) • What information do you know? What is the question asking you? • Will your answer be more than one? Less than one? Or equal to one? How do you know? • How many $\frac{1}{5}$ do you have? How many $\frac{1}{5}$ make one whole? • How many one-fifths are in *eight-fifths*?	

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PROBLEM	HINTS	EXTENSIONS
Which is larger: One-quarter or one-eighth?	• What information do you know? What is the question asking you? • Can we use a visual representation to help? What about Benchmark Fractions? Common numerators? Equivalent fractions? Unit fractions?	• How many one-eights create one-quarter?
Order these fractions from smallest to largest: 1/15 1/11 1/2 1/20 1/100 1/16 1/3	• What information do you know? What is the question asking you? • What is the same about these fractions? What is different about them? • Think about the strategy used in the previous question • Can we use a visual representation to help? What about Benchmark Fractions? Common numerators? Equivalent fractions? Unit fractions?	• Use the numbers from 1-9 only once, to create four fractions of your own. Order them from least to greatest using each of the following: • Visual representations • Benchmark Fractions ($\frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}$) • Equivalent Fractions • Unit Fractions
Reduce the following fractions to their lowest terms. $\frac{3}{6}, \frac{4}{10}, \frac{36}{48}$	• What information do you know? What is the question asking you? • What is the same about these fractions? What is different about them? • What do we mean when we say “reduce a fraction”? • A visual representation might help!	• Order the fractions from least to greatest. • Can you do it using each of the following strategies? Why or why not? • Visual representation(s) • Benchmark Fractions • Common numerators • Equivalent fractions • Unit fractions • When would it make the most sense to use each of these strategies?
Which one doesn’t belong? $\frac{-6}{8}, -\frac{9}{12}, \frac{12}{-16}, \frac{-3}{-4}$	• What information do you know? What is the question asking you? • What is the same about these fractions? What is different about them? • How can we compare these fractions: Visual representation or a model? What about Benchmark Fractions? Common numerators? Equivalent fractions? Unit fractions? • What do you remember about integer division? • Try simplifying first!	• Can you find reasons why each of the fractions that you did not select do not belong? • When one number in the fraction is negative, what does that tell us about the sign of the fraction? What if both the numerator and the denominator are negative? • When we see that the fraction is negative, always put it in the numerator position! It will help us down the line!

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PROBLEM	HINTS	EXTENSIONS
Order the fractions from least to greatest: $\frac{-1}{-2}, -\frac{1}{2}, \frac{1}{4}, \frac{1}{-4}$	• What information do you know? What is the question asking you? • What is the same about these fractions? What is different about them? • What does the denominator tell you about the size of each fraction? How does that information help you determine where to put it on a number line? • How does the sign of the fraction help you to determine where to put it on a number line? • How might you compare these fractions? • Try simplifying first! • A number line might help here! • When we move from left to right on a number line the numbers get larger. This is true when we work with integers as well.	• What strategy/strategies did you use to solve this problem? • Can you find a different way to solve this problem? • What was the most challenging part of this problem for you? What part did you find easy? • Use the numbers from 1-9 (only once) and positive and negative signs to create four fractions of your own. Order your fractions from greatest to least and be prepared to explain how decided where they should go. How many different strategies can you use to order your fractions? • If you were to write a note to your "future forgetful self" about solving this type of problem, what information would you include? Discuss in your group what you think the most important ideas are.
Order these fractions from least to greatest: $2\frac{3}{4}, -2\frac{1}{4}, \frac{5}{-2}, \frac{-3}{5}, \frac{19}{9}$	• What information do you know? What is the question asking you? • What is the same about these fractions? What is different about them? • How can you use previous problems that we have solved to help you solve this one? • What does the denominator tell you about the size of each fraction? How does that information help you determine where to put it on a number line? • How does the sign of the fraction help you to determine where to put it on a number line?	• What strategy did you use to solve this problem? Why did you use that strategy? • What was the most challenging part of this problem for you? What part did you find easy? • Can you find a different way to solve this problem? • If you were to write a note to your "future forgetful self" about solving this type of problem, what information would you include? Discuss in your group what you think the most important ideas are.

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Teacher Observations/To Go Back to During Gallery Walk:

