Foundation – Representing Improper Fractions

Write ¾ on a white board

1. Picture the fraction ¾ in your mind. What does your picture look like?
    a. Does your picture have more than ½ shaded or less than ½ shaded? More than ½ shaded.
    b. So is ¾ bigger than ½ or smaller than 1/2? Bigger than ½.
    c. Is ¾ closer to 0 or closer to 1? Closer to 1
    d. Is ¾ a proper fraction or an improper fraction? Why? Proper – make sure students say because it is <u>less than one whole</u> even if they give other answer first such as because the top number is smaller than the bottom number.

Draw a number line on the white board. Label 0, 1, and 2. Make sure the number line has arrows that extend in both directions.

2. Where does ¾ go on this number line?

3. Let's say I'm running a race and I went ¾ of a mile in 5 minutes. If I keep running the same pace, can you use the number line to <u>estimate</u> about how far I would go after 10 minutes? Approximately 6/4 of a mile.
    a. Can you use a fraction to tell me exactly how far I have gone after 10 minutes? If students need a hint, start by telling them they need to double the fraction ¾. If they need another hint, add partitions to the number line that show all of the fourths. Students can also use the fractions strips in the Toolbox on their iPad.
    b. Is 6/4 a proper fraction or an improper fraction? Improper. Why? Make sure students say it is improper because it is <u>greater than one whole</u> even if they also say it is because the top number is larger than the bottom number.
    c. How can you use your fractions strips to make a picture of 6/4? If students need help, ask them to show 3/4 using fractions strips. Then ask them to show 4/4. Then ask them how they could add another 2/4 to their picture.
    d. Look at the picture of 6/4. How many whole strips do you see? One. What fraction does the second strip in your picture represent? 2/4. What mixed number does your picture represent? 1-2/4.

4. Represent the following improper fractions and decide what mixed number is equivalent to each:
    7/2 (3 ½)   8/4 (2)   9/5 (1-4/5)

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Management Notes	Teacher Notes
➢ You may want to have students draw their own number lines on a sheet of paper rather than using a whiteboard to show the number line. If you do this, have students work in pairs or small groups so you can hear them discuss their answers.	➢ A FOUNDATION lesson provides the essential groundwork for future understanding with fractions. Do not omit any part of this lesson unless it states optional in the plan. ➢ ALWAYS ask the student to explain their thinking through models, explaining verbally (group share, partner share, to the teacher), or write down their thinking.
Target Skills	**Materials**
• I.C. Represent proper fractions as a number on the number line. • I.E. Represent improper fractions CE.C. Convert improper fractions to mixed numbers and mixed numbers to improper fractions. • CE.I. Use common benchmarks to compare proper fractions and improper fractions • CE.J. Interpret the relative size of fractions on the number line.	• Whiteboard • iPads or paper and pencil

Explore Phase

Possible Solution Paths	Guiding Questions
<u>Benchmark Comparisons</u> A student may be able to visualize the benchmarks ½ and ¾ on the number line.	<u>Assessing Questions:</u> ➢ How did you know where these fractions were located on the number line? <u>Advancing Questions:</u> ➢ Where is 2/4? It's right here in the middle between ¼ and ¾. ➢ What do you notice about 2/4? It's the same as ½!

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Doubling A student may be able to add ¾ and ¾ to get 6/4.	Assessing Questions: ➢ How did you know that ¾ + ¾ = 6/4? The whole is divided into fourths. You went ¾ of a mile and then another ¾ of a mile, so I just added the parts that you ran. That was 6 of those fourths. Advancing Questions: ➢ What if I ran another ¾ of a mile in the next 5 min. How far will I have run? 9/4 ➢ Is there another way to say 9/4? 2-1/4
Proper v. Improper Definitions A student understands the difference in proper and improper fractions.	Assessing Questions: ➢ How can you tell whether a fraction is proper or improper? If a fraction is less than one then it is proper. If it is greater than one then it is improper. Simply as that! Advancing Questions: ➢ So is 4/3 proper or improper? How do you know? 4/3 is improper, because 3/3 = 1, so 4/3 > 1.
Possible Student Misconceptions	
Benchmark Comparisons A student may be able placing ½ on the number line but have difficulty placing ¾ on the number line.	Assessing Questions: ➢ How do you know where ½ is on the number line? Well, it's halfway between the two numbers. ➢ What is halfway between 0 and ½? ¼ ➢ If the student has difficulty coming up with fourths…How many parts is the line divided into with ½? 2 ➢ Now let's divide it into four parts. What is smaller than ½ now? ¼ Advancing Questions: ➢ What is larger than ½ now that we've divided the line into fourths? ¾

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Doubling	Assessing Questions:
A student may see ¾ but have trouble doubling the number to equal 6/4.	➢ How far did I run in 5 min.? ¾ of a mile ➢ How many parts of the whole is ¾? 3 So how many parts do we have the whole divided into? 4 ➢ Let's divide the next whole (1-2) also into fourths. Now if I run another 5 min., how far will I run? Count the fourths. 6/4 Advancing Questions: ➢ Is 6/4 greater than or less than one whole? Greater.

Entry/Extensions	**Guiding Questions**
If students can't get started…	Assessing Questions: ➢ Draw me a model of ½. Now draw me a model of ¾. ➢ Which is greater? ¾ Advancing Questions: ➢ Is ¾ closer to 0 or 1? How do you know? ¾ is closer to 1, because I can see that it is. Also it's only ¼ away from 1 where it's ¾ away from 0.
If students finish early…	Assessing Questions: ➢ How do you know ¾ + ¾ = 6/4? The whole is divided into fourths. You went ¾ of a mile and then another ¾ of a mile, so I just added the parts that you ran. That was 6 of those fourths. ➢ What is another way to say 6/4? 6/4 = 1-2/4 or 1-1/2 Prove your response. The student should provide models to explain his thinking. Advancing Questions: ➢ If I were to run 1/5 of a mile in 5 min., how far would I run in 10 min.? How do you know? 2/5 of a mile. The student should provide a model to explain his thinking.