Extension – To Grandma's House

Student Handout

Dustin left his house at 9:00 AM to ride his bicycle to his grandma's house 5 miles away. Halfway there he got thirsty and decided to stop at McDonald's. He traveled another ¼ of a mile and saw his friend Eric outside his house. Dustin asked Eric to come with him to his grandma's house. They both rode their bicycles the rest of the way to Dustin's grandma's house.

Before you begin solving specific distances, estimate the location of each place on a number line: Grandma's house, Eric's house, Dustin's house, McDonald's. Then solve each of the following to check your estimations.

1. How far was McDonald's from Dustin's house? 2 ½ miles How can you represent this in a model or picture?
2. How far had Dustin travelled when he met up with Eric at his house? 2 ½ + ¼ = 2 ¾ miles Use the workspace on your iPad to represent this on a number line.
3. How far did Dustin and Eric travel together on their bicycles? 5 miles – 2 ¾ miles = 2 ¼ miles How do you know?

Bonus Questions!

- If Dustin can ride 10 miles per hour, how long would it have taken him to ride to Grandma's house if he had not stopped? ½ hr. Explain your thinking in words on your iPad or a sheet of paper.
- How far does Eric live from Dustin's grandma's house? 2 ¼ miles
- When Dustin and Eric return to Eric's house, how far has Eric travelled on his bike with Dustin? 2 ¼ + 2 ¼ = 4 ½ miles or 2 ¼ x 2
- If Dustin and Eric visited for two hours with Grandma and Dustin spent 15 min. at McDonald's earlier, what time did Dustin get home? Do you think Dustin made it home in time for lunch? Left at 9:00 a.m. (:30 min. ride) + :15 break + 2 hours at Grandma's = 2:45 + :30 ride home = 3:15 total time away from home = 12:15 p.m. (just in time for lunch!)

Management Notes	Teacher Notes
• You may need to show the students how to draw a number line using the Drawing Tools on the iPad and model how to use it. • You may also need to show students how to use the mixed number representation in the toolbox.	• Encourage students to think about how to add and subtract mixed numbers conceptually using models rather than procedurally.
Prerequisite Skills & Target Skills	**Materials**
Prerequisite Skills • I.A. Represent proper fractions as parts of a whole. • I.D. Represent mixed numbers. **Target Skills** • CE.J. Interpret the relative size of fractions on a number line • AS.B. Add unit fractions and decompose the sum of a fraction into unit fractions.	➢ iPads or paper & pencil ➢ Student copies of the task

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Secondary Target Skills • AS.A. Estimate the sum and difference of proper fractions • MD.A. Multiply a whole number by a proper fraction and a proper fraction by a whole number	
Explore Phase	
Possible Solution Paths	**Guiding Questions**
Half-way Some students may say that they just know that half of 5 is $2\frac{1}{2}$.	Assessing Questions: ➢ How can you use a model to show that half of 5 is $2\frac{1}{2}$? Advancing Questions: ➢ What does this tell you about halving odd numbers?
Adding w/unlike Denominators Students may realize the relationship between halves and fourths and know that $\frac{2}{4} = \frac{1}{2}$.	Assessing Questions: ➢ How can you use a model to show that $\frac{2}{4} = \frac{1}{2}$? Advancing Questions: ➢ How would you explain the relationship between halves and fourths to someone who doesn't understand equivalency?
Distance Travelled together Students may realize how to decompose a whole number to subtract a mixed number from it.	Assessing Questions: ➢ How can you use a model to represent how you decomposed 5 into fourths? Advancing Questions: ➢ How can this method help you when subtracting two mixed numbers from each other? (i.e. $5\frac{1}{4} - 2\frac{1}{2} = ?$)
Possible Student Misconceptions	
Half-way When they realize that halfway is the same as $\frac{1}{2}$ of a number, the whole number 5 may confuse some students.	Assessing Questions: ➢ How much is half of something? Advancing Questions: ➢ How can we represent halving an odd number equally?
Adding w/unlike Denominators If a student doesn't fully understand equivalent fractions, then adding halves and fourths could be challenging. Incorrect: $2\frac{1}{2} + \frac{1}{4} = 2\frac{2}{6}$	Assessing Questions: ➢ How many fourths are in $\frac{1}{2}$? ➢ Show me how you know this. Advancing Questions: ➢ How would converting $\frac{1}{2}$ into fourths help us solve this problem: $2\frac{1}{2} + \frac{1}{4} = ?$

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Distance Travelled together Some students may subtract only the whole numbers and ignore the value of the fraction when subtracting a mixed number from a whole number. Incorrect: $5 - 2\frac{3}{4} = 3\frac{3}{4}$	Assessing Questions: ➢ How can you write the whole number one with fourths? What is $\frac{4}{4} - \frac{1}{4}$? Advancing Questions: ➢ How can this knowing how to write the whole number one as a fraction help us make sense of this problem?
Entry/Extensions	**Guiding Questions**
If students can't get started…	Assessing Questions: ➢ Where is Dustin's starting point? Where will he end? ➢ What is in between Dustin's starting point and his final destination? Advancing Questions: ➢ What key words let you know where he met Eric?
If students finish early…	Assessing Questions: ➢ What key vocabulary helped you realize distances in this problem? Advancing Questions: ➢ If Dustin met up with Eric a quarter of the way from Grandma's house, how far would Dustin have ridden on his bike at that point?