Lesson 6-12A **Action Fractions** Math+CT

Storyboarding: **Time for Lunch, Mack!**

Math Connections: Students solve a mixed-fraction number story. CS Connections: Students prepare to create animations in Scratch by considering a simple mixed fraction number storyboard with 4 scenes.

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		Computational Thinking
1 w	arm ህወ 10–15 min	 SEQUENCE: Precision and completeness are important when writing instructions in advance. SEQUENCE: Programs are made by assembling instructions from a limited set. DECOMPOSITION: Problem decomposition is a useful early step in problem solving.
Subt	tracting Mixed Numbers	
Stud	dents solve a math message involving mixed nbers.	
"I Ca	an" Statements	
Stud	lents read the explicit math and CS goals.	

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Focus

40-45 min

Mixed Numbers on Number Lines Getting Mack Home project (for review); Students review the Getting Mack Home project and think about the features of a new number story. Time for Lunch, Mack!

Students look at an inspiration project and an example storyboard organizer.

Planning a Mixed Fraction Story

Students plan their own fraction number story by completing a storyboard.

Number Story Planning page

Time for Lunch, Mack! (Teacher) project; Example Storyboard Organizer

Number Story Planning Page; Storyboard Organizer; Time for Lunch, Mack! (Student) project

"I Can ..." statements

- I can solve a mixed-number subtraction number story.
- •I can decompose a number story into scenes for the characters and objects.
- •I can [meaningfully] order the actions of characters to create an animation.
- I can use wait blocks to synchronize the characters' actions.
- I can create a program to animate a number story in Scratch.

Anticipated Barriers

- Students may have difficulty coming up with a number story and plot that is suitable for animating in Scratch.
- Students may need to be reminded to use only 2 characters and limit their actions to blocks they know how to use in Scratch.

Student Options

Consider these options for adapting the lesson to your students' preferences:

- Students may need to review the strategies for rewriting mixed numbers as improper fractions.
- Students may want to act out the characters' script.
- Students may wish to use more than 4 scenes.

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Unit 6 | Division; Angles

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1) Warm Up 10-15 min

Subtracting Mixed Numbers

Ask students to solve the following problem individually or with a partner: Mack the dog is 4 miles from home. After he walked $1\frac{1}{4}$ miles, he stops to take a rest. How much farther does he have to walk to get home? $2\frac{3}{4}$ mile

Encourage students to use their preferred strategy or fraction model to solve the problem. As needed, remind them of the strategies from the Math Message in Lesson 6-12. When most students are finished working, have students share how they solved the number story. *Possible strategies:*

• Subtract by counting up.

$$1\frac{1}{4} + \frac{3}{4} = 2$$

$$2 + \frac{3}{4} = 2\frac{3}{4}$$

• Replace each mixed number with an equivalent fraction.

$$4 = \frac{10}{4}$$

$$1\frac{1}{4} = \frac{5}{4}$$

$$\frac{16}{4} - \frac{5}{4} = \frac{11}{4} \text{ or } 2\frac{3}{4}$$

• Use fraction circles to represent and subtract numbers.



Tell students that today they will work in Scratch to create an **animation** to illustrate a fraction number story with mixed numbers. As needed, ask: *What fraction model could we use to show Mack walking to stop for a rest and then walking home?* a number line

As needed, remind students of a comic strip and what it means to **animate** a story, or create an animation. Today in class they will learn to plan their animations using a storyboard. They will use the storyboard to decompose (or break down) their story into scenes (still images) like a comic strip and add other details they need to make their Scratch project work. Some students may remember this from the Grade 3 lessons *Fraction Comic Strip* and *Fraction Number-Line Mysteries*.

I Can ...

Display the "I Can ..." statements and remind students that these statements express the goals for today's lesson and can give them clues about what to expect. Carefully read each statement and ask them to use their thumbs to show how true they feel each statement is for them right now.

SS: Getting Mack Home



35–40 min

Mixed Numbers on Number Lines

 WHOLE CLASS
 SMALL GROUP
 PARTNER
 INDEPENDENT

Remind students of the Getting Mack Home project from the previous lesson (https://scratch.mit.edu/projects/210105463/). Remind them that in this story, Mack walked part of the way home first, then walked the rest of the way home. Ask: *If we wrote new number story with mixed numbers that was similar to this, what could we reuse from this project to illustrate our new story? What would we have to change?* Sample answer: Mack is walking home, so we could use the same background and sprites, but we would have to change the number line.

Now lead a class discussion to get an overall idea of the flow of a new story based on the following.

Mack the dog is 5 miles from home. After he walked $1\frac{1}{2}$ miles, he stops to take a rest. How much farther does he have to walk to get home? $3\frac{1}{2}$ miles

Ask:

- What is a mixed-fraction number sentence we can write to represent Mack's journey home? $5 - 1\frac{1}{2} = 3\frac{1}{2}$ or $1\frac{1}{2} + 3\frac{1}{2} = 5$
- How many total miles is it to Mack's house? 5
- What number-line labels and partitions make sense for this problem? A number line segment from 0 to 5 partitioned into halves.
- How many "halves" would be from the start to the end of this number line segment? $5 \times 2 = 10$
- If the total length of the line segment is 360 steps in Scratch, what would be the length of each "half?" $360 \div 10 = 36$

Referring to the number sentence you wrote, ask students to think about how far Mack will walk first, then second. Because we are labeling in halves, we need to use equivalent fractions to replace each mixed number with an equivalent fraction.

- What is our addition number sentence if we replace the mixed numbers? $\frac{3}{2} + \frac{7}{2} = 5$
- How many halves will Mack walk first? 3
- How many halves will Mack walk second (to get home)? 7

Tell students that they will get a chance to work in partnerships to fill out a planning page with questions like this to help them come up with their own mixed-fraction number sentence for Mack's journey home.

	Getting Mack Home (7 See Inside		
	Thinks to LTEC-2 for the original project 04 5-7: Subtracting Fractions - Same Denominators - Student,	P	
	Click the green flag to see Mack walk to the puddle, get wet, then ask you to write the code to help him walk home to get dry.	ľ	
	Purpose: On the Mack sprite, add code to the "When gree	n	
	Here: Here:		
- *	the script for the "white i receive shuttine pudgie event so that Mack can get home no matter where the pudgie is.	ł	
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Ň	umber Story Planning	0	
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(1) How many total miles to Mack's house? (Choose a number between 2 and 5.) Hint: You will use this to choose your backdrop.	0	
2) Write a fraction number sentence for Mack's journey home. (Use mixed fractions and halves.)	0	
		0	
3) How many equal parts will there be on this number line?	1	
	Hint: Partition the number line segment into halves and total the halves.		
4	I in the total length of the line segment is 360 steps in Scratch, what would be the length of each partition?	0	
	HINT: Unvide 360 by your answer to question 3.	0	
(5	י אסא write your fraction number sentence as an addition.	0	
		0	
6) How many halves will Mack walk first?		
G) How many halves will Mack walk second (to get home)?	1	
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Time for Lunch, Mack!

Now tell students that you will look at an example inspiration project. Open the Time for Lunch, Mack! (Teacher) project (<u>https://scratch.mit.edu/</u><u>projects/373636787/</u>) and model using the TIPP&SEE protocol.



As you **S**ee Inside and **E**xplore the project, ask students what they notice about this project that may be different from the previous project and might help with a new story. Sample questions:

- What characters are in this story? Mack and his Mom
- What do the characters do in the story? Sample answer: Mack thinks about being hungry, walks part of the way home and stops. His Mom appears and calls him for lunch. He talks and walks the rest of the way home. When he gets home, they say "Let's eat."
- How does Mack move across the number line? He moves and pauses at every partition.
- *How are variables used in this project?* Sample answer: The WalkSize variable is used to store the length of each partition.
- How does Mama know when to appear or bark? Answers vary.
- How are conditionals used in this project? Repetition? Answers vary.

Now tell students you will work as a class to decompose the story into scenes and complete a storyboard for this project. Display the partially completed Example Storyboard Organizer and model adding details to complete the example storyboard together.

Example Storyboard Organizer:



Planning a Mixed Fraction Story

WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT

Distribute the Number Story Planning Page and have children work in partnerships to come up with their own mixed fraction number sentence for Mack's journey home.

When they have completed the planning page, distribute the blank storyboard organizer to children and have them work in their partnerships to complete the storyboard for their story. As needed, remind children to only focus on the details they need to help them create their animation in Scratch. They should not spend too much time adding details to the line drawings.

As needed, refer to the example Teacher project and storyboard to help students come up with the right blocks for the actions in each of their scenes.

Wrap Up

WHOLE CLASS SMALL GROUP PARTNER INDEPENDENT

Tell students to save their storyboards for Lesson 6-12B, when they will get a chance to animate their number stories in Scratch, using a starter project (<u>https://scratch.mit.edu/projects/373528821</u>). If time allows, choose one or two volunteer groups to share their storyboards with the class. Have students help add missing details to each storyboard.

Suggested questions:

- How was it helpful to decompose the story into scenes? Answers Vary
- What changes did you notice when you thought about moving from one scene to the next? Answers Vary
- What was challenging about creating a storyboard? Answers Vary
- How did talking with a partner help you create your storyboard? Answers Vary
- How do you think you will use your storyboard when you are animating in Scratch? Answers Vary

Now "I Can …" Review today's "I Can …" statements and ask students to use their thumbs to show their opinion of each statement.

Number Story Planning Time for Lunch, Mack! Number Story Planning (1) How many total miles to Mack's house? (Choose a number between 2 and 5.) int: You will use this to choose your backdrop (2) Write a fraction number sentence for Mack's journey home. (Use mixed fractions and halves.) (3) How many equal parts will there be on this number line int: Partition the number line segment into halves and total the halves ④ If the total length of the line segment is 360 steps in Scratch, what would be the length of each Hint: Divide 360 by your answer to question 3. (5) Now write your fraction number sentence as an addition 6 How many halves will Mack walk first? int: Convert your mixed numbers to fractions first (7) How many halves will Mack walk second (to get home)? Storyboard Organizer Îñ "I Can ..." statements • I can solve a mixed-number subtraction number story. •I can decompose a number story into scenes for the characters and objects. •I can [meaningfully] order the actions of characters to create an animation. •I can use wait blocks to synchronize the characters' actions. • I can create a program to animate a number story in Scratch.

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1	How many total miles to Mack's house? (Choose a r Hint: You will use this to choose your backdrop.	number between 2 and 5.)	5
2	Write a fraction number sentence for Mack's journe $5 - 1\frac{1}{2} = 3\frac{1}{2}$ or $1\frac{1}{2} + 3\frac{1}{2} = 5$	ey home. (Use mixed fracti	ions and halves.)
3	How many equal parts will there be on this number Hint: Partition the number line segment into halves	line? $10 (5 \times 2 = 10)$ and total the halves.	
4	If the total length of the line segment is 360 steps in partition? $360 / 10 = 36$ Hint: Divide 360 by your answer to question 3.	n Scratch, what would be t	he length of each
5	Now write your fraction number sentence as an add $\frac{3}{2} + \frac{7}{2} = 5$	dition.	
6	How many halves will Mack walk first? Hint: Convert your mixed numbers to fractions first.		
7	How many halves will Mack walk second (to get hor	ne)?	