

<p>Task: Chocolate Chips Task 4th Grade</p>	
<p>Lily and Anna are making chocolate chip cookies. They will need $4\frac{1}{4}$ cups of chocolate chips to make cookies for their friends. Lily has $2\frac{3}{4}$ cups of chocolate chips. Anna has $1\frac{3}{4}$ cups of chocolate chips. If they combine their chocolate chips, how much will they have? Will they have enough to make the cookies for their friends? Explain how you know and include an equation in your explanation.</p>	
<p>Teacher Notes</p>	
<p>This task is designed to be used to introduce children to addition of mixed numbers. Students are not asked to draw a picture to explain their thinking but this could be a solution path. Students should be able to identify an addition equation for this problem regardless of the solution path taken. Whole group discussion after the task should highlight that mixed numbers with like denominators can be combined by combining wholes and fractional pieces or by expressing all wholes as fractional pieces of the same size and combining them. The total amount of chips needed could be expressed in number of fractional pieces ($\frac{18}{4}$) or number of wholes and additional fractional pieces ($4\frac{2}{4}$). To complete this task, children will need to have an understanding of comparing fractions or mixed numbers.</p>	
<p>Common Core State Standards for Mathematical Content</p>	<p>Common Core State Standards for Mathematical Practice</p>
<p>4.NF.B.3.c Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.</p>	<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.
<p>Essential Understandings</p>	
<ul style="list-style-type: none"> • Adding and subtracting fractions is joining and separating parts. • Equivalent fractions have the same value. • A mixed number is a whole number and a fractional part which can be written as a fraction with a numerator greater than the denominator. • Fractional numbers and mixed numbers can be added and/or subtracted. • When adding/subtracting fractions with the same denominator, numerators are added/subtracted but the denominator remains the same. • Fractions representing the same size pieces (common denominators) from the same size whole, can be combined and only the number 	

of the pieces (the numerator) will need to be considered.

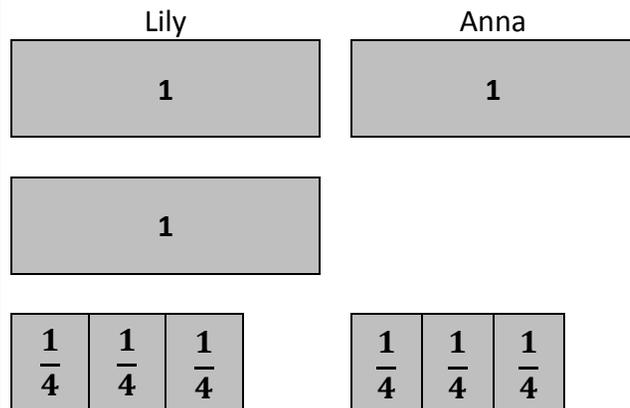
- Fractions representing the same size pieces (common denominators) from the same size whole, can be compared to each other because the size of the pieces is the same.

Explore Phase

Possible Solution Paths

Drawing a picture

Area Model – Fraction Tiles



Student can draw pictures to show combining $2\frac{3}{4}$ and $1\frac{3}{4}$. Student then demonstrates that $\frac{1}{4}$ can be combined with $\frac{3}{4}$ to make a new whole. The combined total of chips will be $4\frac{2}{4}$ cups. Because $4\frac{2}{4} > 4\frac{1}{4}$, Lily and Anna will have enough chocolate chips.

Assessing and Advancing Questions

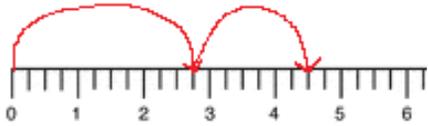
Advancing Questions:

- What is an equation that would show the number of cups of chocolate chips that Anna and Lily have altogether?
- What are other ways that someone might choose to write $4\frac{2}{4}$?

Assessing Questions:

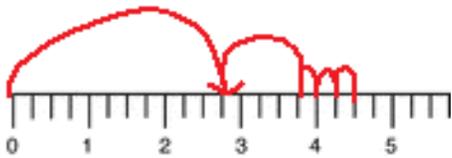
- Show me in your model the amount of chocolate chips that Lily has. Show me in your model the amount of chocolate chips that Anna has. How can your drawing help you find the combined amount of chocolate chips?
- How do you know $4\frac{2}{4} > 4\frac{1}{4}$?

Number Line



Student shows a jump of 2 – followed by a jump of 1 – and shows that the last jump lands on 4 –. Because 4 – is to the right (or beyond) 4 –, the student determines that Anna and Lily have enough chocolate chips for the cookies.

OR.....



Student shows a jump of 2 –. Student adds 1 – by breaking it apart and jumping in increments until 1 – has been added. For example, student jumps 1 whole unit to land on 3 – and continues to jump – units three times and lands on 4 –. Because 4 – is to the right (or beyond) 4 –, the student determines that Anna and Lily have enough chocolate chips for the cookies.

Advancing Questions:

- What is an equation that would show the number cups of chocolate chips that Anna and Lily have altogether?
- What are other ways that someone might choose to write $4 -$?

Assessing Questions:

- Show me on your number line the amount of chocolate chips that Lily has. Show me on your number line the amount of chocolate chips that Anna has. How did you use this information to find the total number of chocolate chips with the number line?
- How do you know $4 - > 4 -$?

Using Properties of Operations

$$\begin{aligned}2 \frac{3}{4} + 1 \frac{3}{4} &= (2 + \frac{3}{4}) + (1 + \frac{3}{4}) \\ &= 2 + 1 + \frac{3}{4} + \frac{3}{4} \\ &= 3 + \frac{6}{4} \\ &= 3 + \frac{4}{4} + \frac{2}{4} \\ &= 3 + 1 + \frac{2}{4} \\ &= 4 \frac{2}{4} \text{ (solution could also be expressed as } 4 \frac{1}{2}\text{)}\end{aligned}$$

OR.....

$$\begin{aligned}2 \frac{3}{4} + 1 \frac{3}{4} &= (2 + \frac{3}{4}) + (1 + \frac{3}{4}) \\ &= (\frac{4}{4} + \frac{4}{4} + \frac{3}{4}) + (\frac{4}{4} + \frac{3}{4}) \\ &= \frac{11}{4} + \frac{7}{4} \\ &= \frac{18}{4} \text{ (answer can also be expressed as } 4 \frac{2}{4} \text{ or } 4 \frac{1}{2}\text{)}\end{aligned}$$

The girls have $4 \frac{2}{4}$ cups of chocolate chips. $4 \frac{2}{4}$ is greater than $4 \frac{1}{4}$.
Lily and Anna have enough chocolate chips to make the cookies.

Assessing Questions:

- How do you know that $2 \frac{3}{4} = 2 + \frac{3}{4}$?
- How do you know that $1 \frac{3}{4} = 1 + \frac{3}{4}$?
- How do you know that $\frac{3}{4} + \frac{3}{4} = \frac{6}{4}$?
- Why did you choose to decompose $\frac{6}{4}$ into $\frac{4}{4} + \frac{2}{4}$?
- How do you know that $2 \frac{3}{4} = \frac{4}{4} + \frac{4}{4} + \frac{3}{4}$?
- How do you know that $1 \frac{3}{4} = \frac{4}{4} + \frac{3}{4}$?
- How did you add $\frac{11}{4} + \frac{7}{4}$ and get a solution of $\frac{18}{4}$?

Advancing Questions:

- Why do you only add the numerators when adding fractions with common denominators?
- Write a rule that can be used to add fractions with common denominators.
- Is it possible to subtract only the numerators when subtracting fractions with common denominators? Explain why this works.

<p>Converting Mixed Numbers to Equivalent Fractions</p> $2\frac{3}{4} + 1\frac{3}{4} = \frac{11}{4} + \frac{7}{4} = \frac{18}{4}$ <p>(answer can also be expressed as $4\frac{2}{4}$ or $4\frac{1}{2}$)</p> <p>The girls have $\frac{18}{4}$ cups of chocolate chips.</p> <p>They need $4\frac{1}{4}$ cups or $\frac{17}{4}$ cups.</p> $\frac{18}{4} > \frac{17}{4}$ <p>Lily and Anna have enough chocolate chips to make the cookies.</p>	<p>Assessing Questions:</p> <ul style="list-style-type: none"> • How do you know $2\frac{3}{4} = \frac{11}{4}$? • How do you know $1\frac{3}{4} = \frac{7}{4}$? • How did you add $\frac{11}{4} + \frac{7}{4}$? <p>Advancing Questions:</p> <ul style="list-style-type: none"> • What could be a rule for adding fractions with common denominators? • How would you add fractions if the denominators were not the same?
Possible Student Misconceptions	
<p>Student combines numerators and denominators for the total fractional amount.</p> <p>Example:</p> $\frac{11}{4} + \frac{7}{4} = \frac{18}{8}$ <p>Student added $11 + 7$ and $4 + 4$ to get an incorrect answer of $\frac{18}{8}$.</p>	<p>Assessing Questions:</p> <ul style="list-style-type: none"> • Explain how you got the answer of $\frac{18}{8}$? • Is this answer reasonable? How do you know? <p>Advancing Questions:</p> <ul style="list-style-type: none"> • Explain what it means to combine $\frac{11}{4}$ and $\frac{7}{4}$. How can this help me to make sure I have the correct answer? • What is another way to check your answer?
Entry/Extensions	
<p>If students can't get started....</p>	<p>How can you find the total cups of chocolate chips that Anna and Lily will need to make the cookies? Make a drawing to show your thinking.</p>
<p>If students finish early....</p>	<p>How many cups of chocolate chips will Anna and Lily need if they decide to double the recipe? How many more chips will Anna and Lily need to do this?</p>
Discuss/Analyze	
Whole Group Questions	
<ul style="list-style-type: none"> • What is an improper fraction and how can it be represented? • What is the relationship between a mixed number and an improper fraction? • Why does the denominator remain the same when fractions with like denominators are added? 	

