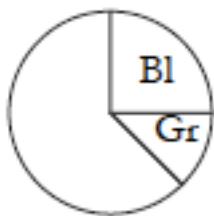# Rational Number Project

Initial Fraction Ideas	Materials
Lesson 20: Overview Students use fraction circles to obtain exact answers to fraction addition.	∞ Fraction Circles for students and teacher ∞ Student Pages A, B, C

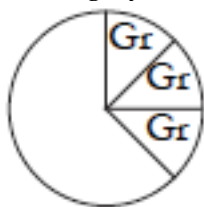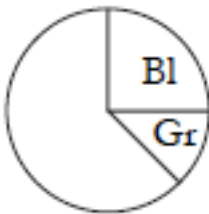| Teaching Actions	Comments
Warm Up If you ran $\frac{3}{4}$ of a mile before lunch and ran $\frac{7}{8}$ of a mile after lunch, about how many miles did you run? **Large Group Introduction** 1. Present this story from Lesson 19. William ate $\frac{1}{4}$ of a pizza for dinner. The next morning he ate a piece that equaled $\frac{1}{8}$ of the pizza. How much of a pizza did he eat? 2. Remind students that they already estimated the sum to be less than $\frac{1}{2}$. Explain that to find the exact sum, they are to use their fraction circles. Model the problem and ask students to do the same with their materials. Say: This blue represents $\frac{1}{4}$ of the pizza. This gray represents $\frac{1}{8}$ of the pizza. 3. Explain that from this picture they can see that William ate less than $\frac{1}{2}$ of the pizza. Ask: Exactly how much pizza did William eat? Is there a way to	Addition of fractions with unlike denominators is introduced right from the start. Students are led to solve the problem of naming the amount of the circle covered using one fraction name. At this point you are trying to develop an implicit understanding of the symbolic procedure. Same denominator means, concretely,

Teaching Actions	Comments
express the amount of circle covered using one fraction name? Fore example, is $\frac{3}{4}$ covered? $\frac{2}{12}$?	using the same color pieces to show each fraction.
4. Ask students to try to find a way to cover $\frac{1}{4}$ and $\frac{1}{8}$ of the circle using only one color.	
5. Give clues if needed: (1) Think about what you know about equivalent fractions; (2) How many grays equal one blue?	
6. Building on students' ideas, lead to modeling the problem, verbalizing each step. "I can tell how much of the whole circle is covered if I can cover the amount with pieces of the same color." "I know 2 grays cover the same amount as 1 blue, so I am going to exchange 1 blue for 2 grays." 	At this point there is no need to record with symbols. Work at the verbal level.
7. Ask: what fraction of the circle is covered? How much pizza did William eat? Is 3/8 less than 1/2?	

8. Repeat with the chocolate chip cookie problem from Activity 20:
 	
    Maria received a chocolate chip cookie as big as a birthday cake for a present. She cut it into 6ths and shared the cookie with her friend LeAnna. Maria ate $\frac{3}{6}$ of the cookie, LeAnna ate $\frac{2}{6}$.
    Together, how much did they eat?
	Important for children to internalize that sometimes you need to find equivalent fractions and sometimes this step is not needed.

10. Ask students if they have to exchange circle pieces in this example to determine the amount of circle covered.	In all exercises so far only 1 of the

Teaching Actions	Comments

11. Repeat for these problems. Encourage children to verbalize each step with materials. Have them attend to the decision of whether or not an exchange is needed. (Don't forget to estimate!)
 	
    (a) $\frac{1}{2}+\frac{1}{4}$
 	
    (b) $\frac{2}{4}+\frac{1}{8}$
 	
    (c) $\frac{2}{3}+\frac{1}{3}$
 	
    (d) $\frac{2}{3}+\frac{2}{3}$
	fractions (or none) need to be changed. In *RNP: Fraction Operations and Decimals* module this work with addition of fractions is extended to where both fractions need to be renamed. [Student page C does provide problems like those for students who need a challenge].
	
	You will want to extend this lesson over 2-3 days.

Small Group/Partner Work 12. Student Pages A and B provide added practice. Student Page C provides challenges. **Wrap Up** 13. Have each group create their own story problem for addition for of fractions to share with the class. Then model how to solve them with the fraction circles.	Mastery of the addition of fractions is not a major goal of this module. You are providing experience that will be extended in the *RNP: Fraction Operations and Decimals* module.

Translations
- ∞ Real world to manipulative to verbal
- ∞ Written symbols to manipulative to verbal

If you ran $\frac{3}{4}$ of a mile before lunch and ran $\frac{7}{8}$ of a mile after lunch, about how many miles did you run?

Fraction Addition and Estimation:
Finding the Exact Answer

1. Marty ate some candy. He ate 1-half of a whole Hershey bar before lunch. He ate 1-fourth of a whole Hershey bar after lunch. About how much of one candy bar did he eat? With your fraction circles, find out the exact amount of a Hershey bar that Marty ate. Draw pictures to show what you did with the circles. Estimate first!!!

Estimate: _____

2. Terri ate 1-half of a small pizza and 5-twelfths of another small pizza. About how much of a whole pizza did she eat? With your fraction circles, find out the exact amount. Draw pictures to show what you did with the circles. Estimate first!!!

Estimate: _____

3. Allie rode her bicycle 7-eights of a mile to school. Then she rode 1-fourth of a mile to her friend's house. About how far did she ride altogether? With your fraction circles, find out the exact amount. Draw pictures to show what you did with the circles. Estimate first!!! (Use back of the page for your drawing).

Estimate: _____

Fraction Addition Continued

4. Because of a rainstorm, the water level in a swimming pool rose $\frac{2}{3}$ of an inch. The following day it rained again. The pool rose another $\frac{11}{12}$ of an inch. About how high did the water level increase? With your fraction circles, find out the exact amount.

Estimate _____

5. Alex used $\frac{1}{4}$ cup of flour in one recipe and $\frac{3}{8}$ cup of flour in another recipe. Together about how much flour did he use? ? With your fraction circles, find out the exact amount.

Estimate _____

6. With your fraction circles, find the exact answers.

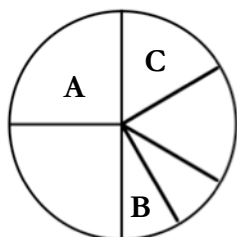$$\frac{1}{3} + \frac{1}{6} \qquad \frac{1}{8} + \frac{3}{4} \qquad \frac{4}{10} + \frac{1}{5} \qquad \frac{1}{6} + \frac{3}{12} \qquad \frac{1}{2} + \frac{3}{4}$$

Challenges

1.

Shade Parts A, B, and C

a) How much are parts A and B together?

b) How much of the circle are Parts A and C together?

c) How much of the circle are Parts B and C together?

2. Describe how you solved the problems.

3. Estimate a sum for each problem. Then find the exact answer using your fraction circles. Explain how these problems are different from the others you solved.

$$\frac{1}{4} + \frac{1}{3} \qquad \frac{1}{2} + \frac{2}{5} \qquad \frac{2}{4} + \frac{5}{6} \qquad \frac{1}{2} + \frac{5}{6}$$