Focus Questions

Background

The student book is organized around three to five investigations, each of which contain three to five problems and a Mathematical Reflection that students explore during class.

In the Teacher Guide the Goals for each unit include two to four big concepts with an elaboration of the essential understandings for each.

In the Teacher Guide, a Focus Question is provided for each problem in an investigation. The Focus Question collapses the mathematical understandings and strategies embedded in the problem into one overarching question. The teacher can use the Focus Question to guide his/her instructional decisions throughout his/her planning, teaching, and reflections on student understanding.

Description

The Goals of the unit describe the mathematics content developed in the unit. The Focus Questions provide a story line for the mathematical development of an investigation. The set of Mathematical Reflections in the student book provide a story line for the mathematical development of the unit. The following contain all of the Goals, Focus Questions and Mathematical Reflections for each unit in CMP3.

Purpose

These stories can serve as an overview of the unit and as a guide for planning, teaching and assessing.

The Goals, Mathematical Reflections, and Focus Questions can be laminated and used a bookmark for the Teacher.

6-3: Let's Be Rational

Unit Goals, Focus Questions, and Mathematical Reflections

Unit Goals

Numeric Estimation Understand that estimation can be used as a tool in a variety of situations including checking answers and making decisions, and develop strategies for estimating results of arithmetic operations

- Use benchmarks and other strategies to estimate results of operations with fractions
- Use estimates to check the reasonableness of exact computations
- Give various reasons to estimate and identify when a situation calls for an overestimate or an underestimate
- Use estimates and exact solutions to make decisions

Fraction Operations Revisit and continue to develop meanings for the four arithmetic operations and skill at using algorithms for each

- Determine when addition, subtraction, multiplication, or division is the appropriate operation to solve a problem
- Develop ways to model sums, differences, products, and quotients with areas, fraction strips, and number lines
- Use knowledge of fractions and equivalence of fractions to develop algorithms for adding, subtracting, multiplying, and dividing fractions
- Write fact families with fractions to show the inverse relationship between addition and subtraction, and between multiplication and division
- Compare and contrast dividing a whole number by a fraction to dividing a fraction by a whole number
- Recognize that when you multiply or divide a fraction, your answer might be less than or more than the numbers you started with
- Solve real-world problems using arithmetic operations on fractions

Variables and Equations Use variables to represent unknown values and equations to represent relationships

- Represent unknown real-world and abstract values with variables
- Write equations (or number sentences) to represent relationships among real-world and abstract values
- Use fact families to solve for unknown values

Focus Questions and Mathematical Reflections

Investigation 1 Extending Addition and Subtraction of Fractions	**Investigation 2** Building Multiplication With Fractions	**Investigation 3** Dividing With Fractions	**Investigation 4** Wrapping Up the Operations
Problem 1.1 Getting Close: Estimating Sums **Focus Question** What are some strategies for estimating the sums of fractions?	**Problem 2.1** How Much of the Pan Have We Sold? Finding Parts of Parts **Focus Question** How does an area model relate to multiplying fractions?	**Problem 3.1** Preparing Food: Dividing a Fraction by a Fraction **Focus Question** What does it mean to divide a fraction by a fraction? What strategies help you divide a fraction by a fraction?	**Problem 4.1** Just the facts: Fact Families for Addition and Subtraction **Focus Question** How do fact families help you solve equations such as $\frac{4}{5} - N = \frac{3}{8}$?
Problem 1.2 Estimating Sums and Differences **Focus Question** How do you know if your estimate is an underestimate or overestimate? What information does an underestimate or overestimate tell you?	**Problem 2.2** Modeling Multiplicative Situations **Focus Question** What strategies can you use to multiply all combinations of factors including whole numbers, fractions, and mixed numbers?	**Problem 3.2** Into Pieces: Whole Numbers or Mixed Numbers Divided by Fractions **Focus Question** What does it mean to divide a whole number or mixed number by a fraction? What strategies help you divide a whole number or mixed number by a fraction?	**Problem 4.2** Multiplication and Division Fact Families **Focus Question** How do fact families help you solve equations such as $\frac{2}{9} \div N = \frac{2}{3}$?
Problem 1.3 Land Sections: Adding and Subtracting Fractions **Focus Question** What are some strategies for adding and subtracting fractions?	**Problem 2.3** Changing Forms: Multiplication With Mixed Numbers **Focus Question** How can you use number properties and equivalent fractions to multiply	**Problem 3.3** Sharing a Prize: Dividing a Fraction by a Whole Number **Focus Question** What does it mean to divide a fraction by a whole number? What	**Problem 4.3** Becoming an Operations Sleuth **Focus Question** How do you know when a particular operation is called for to solve a

	rational numbers?	strategies help you divide a fraction by a whole number?	problem? How do you represent the problem with a number sentence?
Problem 1.4 Visiting the Spice Shop: Adding and Subtracting Mixed Numbers **Focus Question** What are some strategies for adding and subtracting mixed numbers?		**Problem 3.4** Examining Algorithms for Dividing Fractions **Focus Question** What is an efficient algorithm for division problems involving fractions and mixed numbers?	
Mathematical Reflection **1.** **a.** What are some situations in which estimating a sum or difference is useful? Why is estimation useful in these situations? **b.** When is it useful to overestimate? When is it useful to underestimate? **2.** When should you use addition to solve a problem involving fractions? When should you use subtraction? **3.** Suppose you are helping a student who has not studied fractions. Explain to him or her how to add and subtract fractions. Give an example of the type you think is easiest	**Mathematical Reflection** **1.** Explain and illustrate what *of* means when you find a fraction *of* another number. What operation do you use when you find parts of parts? **2.** **a.** If you forget the algorithm for multiplying fractions, how might you use rectangular models to help you multiply fractions? **b.** Describe an algorithm for multiplying any two fractions. **c.** Describe when it might be useful to estimate a product. **3.** Use examples to explain the following statement:	**Mathematical Reflection** **1.** When solving a problem, how do you recognize when division is the operation you need to use? **2.** **a.** How is dividing a whole number by a fraction similar to or different from dividing a fraction by a whole number? **b.** Explain your strategy for dividing one fraction by another fraction. Does your strategy also work for divisions where the dividend or divisor is a whole number or a mixed number? Explain. **3.** When dividing a whole number by a whole	**Mathematical Reflection** **1.** How do you decide which operation to use when you are solving a problem? **2.** How is the relationship between addition and subtraction like the relationship between multiplication and division? How is it different? **3.** While working with fact families, you thought about decomposing numbers. **a.** What does it mean to decompose a number? **b.** How do fact families help you figure out the value for N in a sentence such as $N \div$

to explain. Give an example of the type you think is hardest to explain.	"When you multiply a fraction by another fraction, your answer might be less than both factors, more than one of the factors, or more than both factors."	number greater than 1, the quotient is always less than the dividend. For example, 15 ÷ 3 = 5, and 5 is less than 15 (the dividend). Use examples to explain the following statement: "When you divide a fraction by another fraction, your answer might be greater than the dividend or less than the dividend."	$2\frac{1}{2} = 1\frac{1}{4}$?