Instructional Progression of Fraction and Decimal Operations

Based on *Extending Children's Mathematics: Fractions and Decimals* (ECM), Empson & Levi

Equal Sharing Problems: ECM Chapter 1

•number of objects is greater than the number of sharers- resulting in a mixed number
•number of sharers is greater than the number of objects
Examples of both types are in ECM pages 29-31
Addition/Subtraction of fractions and equivalency ideas will come out in equal sharing problems as well.

Multiple Groups Problems: ECM Chapter 3

number of groups is a whole number and number in each group is a fraction or mixed number

*Multiplcation: Whole number times a unit fraction   24 X 1/4 = n

•Measurement Division: unit fraction   n X 1/4 = 6
•Multiplication: Whole number times a non unit fraction   8 X 3/4 = n
• Measurement Division: non unit fraction   n X 3/4 = 6
Examples of all Multiple Groups problems ECM pages 65-67

Base Ten Ideas: ECM Chapter 7

•Power of ten understanding
•Multiplication and Measurement division problems:
Examples of story problems in ECM pages 171-173

Decimal Operations: ECM Chapter 8

*Addition, subtraction, multiplication, and division in context using story problems

•Addition, subtraction, multiplication, and division equations- no context
Examples in ECM pages 172-173

Adding and Subtracting Fractions: ECM Chapter 8

*In context using story problems   Examples in ECM pages 209-210
*Equations without context using naked number sentences   Examples in ECM pages 210-211

Partial Grops Problems: ECM Chapter 8

number of groups is a fraction (including mixed numbers) and number in each group is a whole number or fraction (including mixed numbers)

5th grade standards only call for dividing unit fractions by whole numbers and whole numbers by unit fractions

*Multiplcation: 2/3 X 4 = n and   2/3 X 3/4 = n   Examples in ECM page 212
*Measurement Division: n X 1/4 = 4 and 1/2   Examples in ECM pages 212-213
*Partitive Division: 1/4 X n = 4 and 1/2   Examples in ECM pages 213-214
*Multiplication and Division equations without context using naked number sentences   Examples in ECM pages 214-216

Note: Fraction equivalence, fraction order, and fraction comparison ideas are interwoven throughout.
See ECM chapter 6 for ways to build these ideas. Examples of problems are on pages 139-143.