N3 - Fractions

Modeling Fraction Sums and Differences

Work in Pairs.

Find **three** different models to represent each situation.

Write an addition sentence for each model.

Use fraction models with at least 2 different “size” pieces or denominators.

Combinations whose sum is 1.

Combinations whose sum is $1\frac{1}{4}$.

Combinations whose sum is $1\frac{1}{2}$.

Combinations whose sum is $1\frac{3}{4}$.

Combinations whose difference is $\frac{2}{3}$.

Combinations whose difference is 1.

Combinations whose difference is $1\frac{1}{4}$.

Combinations whose difference is $1\frac{1}{2}$.
Yack in the Box

Part I

Chen is creating a new game called “Yack in the box,” and he needs assistance in finding the values of the playing pieces. How can he determine the fractional values of his game pieces?

• Work with a partner. A “yack” is a new rod whose length consists of 1 yellow Cuisenaire Rod and 1 black Cuisenaire Rod attached end-to-end.

• Using Cuisenaire Rods, make all one-color combinations that will match the length of the yack.

□ Assume that the length of the yack represents one whole unit. For each of the one-color combinations, find the fractional part of a single rod in relation to the whole yack.

□ Record the color of each rod and its fractional value.

□ Now find the fractional value of each of the remaining rods with the yack representing 1 whole unit.

□ Add your findings to the data already collected and arrange your data in increasing order of value.

□ Look for patterns and relationships in the data. Write a paragraph to explain your findings.
Part 2

Chen is ready for you to play a game of “Yack in the Box”? Can you determine fractional relationships among the rods to help you win the game?

- Work in pairs. Place a set of Cuisenaire Rods in a small box. Decide who will go first. Player A randomly selects 3 rods from the box.

- On a sheet of paper, Player A writes two addition sentences about the 3 rods. One equation should relate the colors of the rods and the other equation should relate their fractional values. Fractional values are to be expressed in terms of yacks. For example, \( r + g + p = e; \) \( \frac{1}{6} \text{ yack} + \frac{1}{4} \text{ yack} + \frac{1}{3} \text{ yack} = \frac{3}{4} \text{ yack}. \)

- Then Player A selects 2 of the 3 rods, and writes two subtraction sentences about them. One equation should relate the colors of the rods and the other equation should relate their fractional values. As before, fractional values should be expressed in terms of yacks. For example, \( p - g = w; \) \( \frac{1}{3} \text{ yack} - \frac{1}{4} \text{ yack} = \frac{1}{12} \text{ yack}. \)

- Player B checks Player A’s equation sheet. If all statements are correct, Player A earns 1 point. If a mistake(s) is found, Player B can make the correction(s), and then he or she receives the point.

- After returning the 3 rods to the box, Player B selects 3 rods from the box, and he or she repeats the activity.

- Play continues by alternately drawing rods, writing the sets of equations, and checking results. The first player to earn 8 points is the winner.
Block Busters

Part I
Solving puzzles can be both fun and challenging. Block Buster puzzles are designed to integrate fraction skills and geometric artistry. How many can you solve?

Working with a partner, use Pattern blocks to solve each of these fraction puzzles in at least two different ways. The fractions refer to the area of each shape.

**Puzzle 1:** Build an equilateral triangle that is $\frac{9}{25}$ green, $\frac{4}{25}$ blue, $\frac{6}{25}$ red, and $\frac{6}{25}$ yellow.

**Puzzle 2:** Build an equilateral triangle that is $\frac{1}{3}$ green, $\frac{1}{3}$ blue, and $\frac{1}{3}$ red.

**Puzzle 3:** Build a parallelogram that is $\frac{1}{16}$ green, $\frac{3}{4}$ red, and $\frac{3}{16}$ yellow.

**Puzzle 4:** Build an isosceles trapezoid that is $\frac{1}{8}$ green, $\frac{1}{5}$ blue, $\frac{3}{8}$ red, and $\frac{3}{10}$ yellow.

Record and color each of your puzzle solutions on Pattern Block triangle paper. Cut out and label the back of each solution with the puzzle number.

Be ready to discuss your findings.
Part 2 Extra Credit

What if... you have an opportunity to create a series of 4 Block Buster puzzles for other students to solve? What challenging problems can you devise?

• Working with your partner, use a combination of green, blue, red, and yellow Pattern blocks to build 4 different geometric figures for the puzzle.
• Record and color the puzzle and its pieces on Pattern Block triangle paper.
• Determine the fractional part of the whole shape that each color represents. Record this information as the clues to build your puzzle.
Fraction Roller Coaster

Players will take turns.

1. Generate 3 random integers on the calculator.
2. Use two of the number to create a fraction.
3. Place your fraction in any of the first 6 boxes.
4. Place the third number in the rejected number column.
5. Generate three more random numbers and repeat steps 3 and 4 until all 12 boxes are filled.
6. You may not move or change any fraction once it has been placed.

The winner is the person with their total closest to 1.