Cuisenaiare Rods as a Model for Fractions

Using the "whole-part-fraction" interpretation of fractions, fill in the following chart using Cuisenaire blocks. Note: there is one that is not possible with this model.

Whole	Part	Fraction
dark green		$\frac{1}{3}$
brown		$\frac{1}{4}$
orange		$\frac{2}{5}$
dark green		$\frac{5}{4}$
dark green		$1 + \frac{2}{3}$
blue	light green	
orange + yellow	dark green	
light green	purple	
orange	dark green	
brown	yellow	
brown	orange	
	red	$\frac{1}{4}$
	dark green	$\frac{3}{5}$
	yellow	$\frac{1}{2}$
	dark green	$1 + \frac{1}{2}$
	red	$\frac{2}{3}$
light green	yellow	
yellow	light green	
orange		$\frac{4}{5}$
	blue	$\frac{3}{4}$
	yellow	$\frac{5}{2}$
orange	purple	
	orange	$\frac{5}{2}$

Pattern Blocks as a Model for Fractions

Using the "whole-part-fraction" interpretation of fractions, fill in the following chart using pattern blocks. If the answer is a shape (i.e., color) and there is more than one way to express the answer, use the smallest number of shapes possible to express your answer.

Whole	Part	Fraction
yellow	blue	
red	green	
yellow	red	
blue	red	
2 yellows	blue	
2 yellows	yellow	
yellow		$\frac{1}{2}$
yellow		$\frac{2}{3}$
red		$\frac{2}{3}$
2 blues		$\frac{1}{4}$
2 yellows		$\frac{1}{3}$
	green	$\frac{1}{3}$
	red	$\frac{3}{2}$
	blue	$\frac{1}{3}$
	blue	$\frac{2}{3}$
	green	$\frac{1}{4}$

Thinking Strategies for Comparing Fractions

Van de Walle presents several "thinking strategies" that can be used to compare fractions based solely on a conceptual understanding of the meaning of a fraction (i.e., without employing a procedure like "cross-multiply" or "common denominators"). For each of the following pairs of fractions, insert the correct symbol ($<$, $=$, or $>$) to express the relative size of the fractions **and explain briefly the thinking strategy you used to make this determination.**

1. $\frac{5}{3} \quad \frac{5}{8}$

2. $\frac{3}{8} \quad \frac{3}{10}$

3. $\frac{3}{7} \quad \frac{5}{8}$

4. $\frac{5}{8} \quad \frac{4}{7}$

5. $\frac{7}{8} \quad \frac{5}{6}$

6. $\frac{2}{3} \quad \frac{3}{4}$

7. $\frac{4}{7} \quad \frac{7}{12}$

8. $\frac{9}{8} \quad \frac{4}{3}$

9. $\frac{4}{10} \quad \frac{5}{12}$

10. $\frac{4}{9} \quad \frac{5}{9}$

Some Percent Problems

1. One Thursday the vice-president of a small company was in a good mood and gave everyone in the company a 10% raise. When the president returned from his vacation on Monday, he immediately ordered to payroll department to cut everyone's pay by 10% to rectify the error of the vice-president. A sharp accountant in payroll objected to the president's plan. Why did he object? What would be the correct way to deal with the situation?

2. Of the three wards in Grand Rapids, 40% of the voters live in the third ward. If a mayoral candidate is pretty confident she will receive at least 60% of the vote in the third ward, what percent must she get in the other two wards to be elected?

3. In a certain town, 50% of the men are married and 60% of the women are married. Assuming that each married man is married to one married woman from the town and vice versa, what percentage of the town is male?

4. A college newspaper did a survey of students and found that

- 10% of the women on campus smoke,
- 20% of the men on campus smoke,
- 30% of the smokers on campus are women,

Are there more men or women on this campus? Is it possible to determine what percentage of the students are women? Is it possible to determine what percentage of the students smoke?

Missing Digits

1. In each of the following, fill-in each box with a single digit to make the number sentence true. You may use a calculator, but be sure to use your brain as well. Also note that one of them cannot be done. Why not?

a) $93 \times 8\square = 8\square\square 1$

b) $83\square \times \square 6 = 46816$

c) $\square\square 6 \times 84\square = 232668$

d) $3\square\square \times \square 7 = 18001$

e) $4\square\square 6 \div 8\square = 48$

f) $9805 \div 8\square = \square 2$

g) $23 \times 3\square \times \square 7 = 13294$

h) $91\square 7 - \square 7\square = 8271$

i) $5418 \div \square\square = 8\square$

j) $7 \times (\square 8 - 2\square) = 122$

Fractions, Decimals, and Percents

Since fractions, decimals and percents are three notational ways of expressing the same number relationship, anything that can be expressed in one of these ways can be expressed in the other two as well. For each of the following exercises, give **exact answers**, not approximations.

1. Convert each of the following percents to an equivalent fraction and an equivalent decimal.

a) 237.5% b) 0.03% c) 5.4%

2. Convert each of the following fractions to equivalent decimals and percents. Notice that some of these "terminate" (eventually "stop"). And others don't.

a) $\frac{11}{8}$ b) $\frac{3}{7}$ c) $\frac{5}{16}$

d) $\frac{1}{3}$ e) $\frac{129}{550}$ f) $\frac{5}{17}$

g) Do you notice anything special about the ones that do not terminate?

h) Is there a quick way to tell (without actually doing the conversion) whether a fraction will have a terminating or nonterminating decimal representation?

3. Convert each of the following decimals to an equivalent fraction and an equivalent percent:

a) 0.375 b) $0.\overline{5}$ c) 2.4

d) 0.65 e) $0.\overline{65}$ f) $0.6\overline{5}$

Some Proportion Problems

1. Ice cream was on sale: 3 half gallon containers for \$5.75. How much would 9 containers cost?

2. If I can paint 120 feet of fence in three hours, how many feet of fence can I paint in four hours? in five hours?

3. Space Man Spif lands on the planet Og, where there are two countries, each with its own currency. If he can exchange 5 grogs for 9 dulaks,

a) How many dulaks is 15 grogs worth?

b) How many dulaks is 12 grogs worth?

4. Van de Walle mentions at least three strategies for solving proportion problems: the unit-rate method, the scaling method, and the cross-product method.

a) Which did you use for each problem above? Could you have used other methods?

b) Which method is simplest in each case? Is that the one you used?

c) When is the unit-rate method especially nice to use?

d) When is the scaling method especially nice to use?