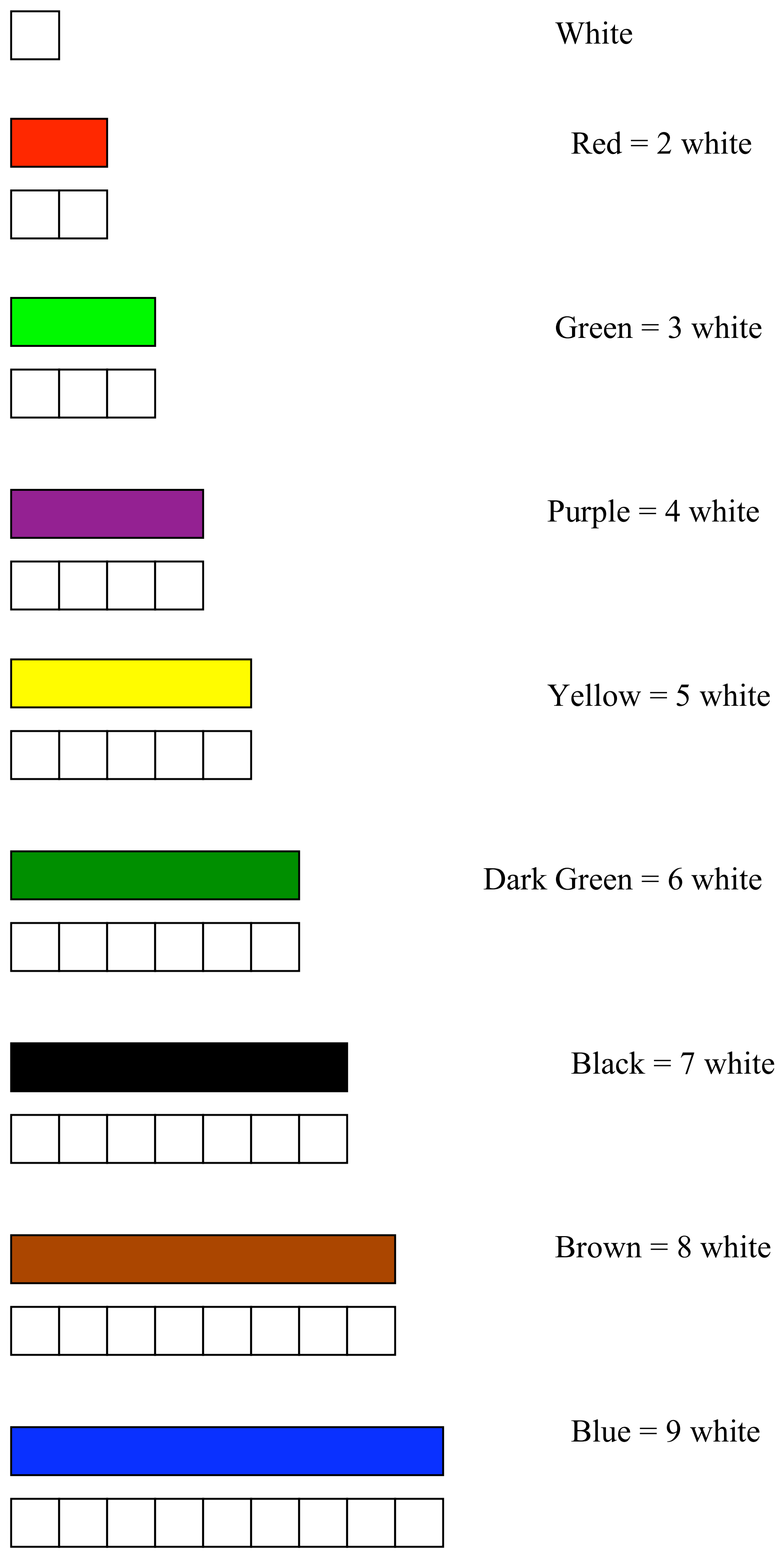
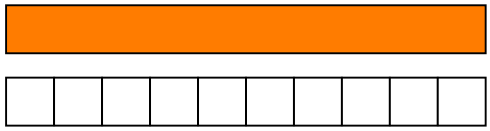
Hanna High School Robert Perez

The first step when using Cuisenaire Rods or any kind of manipulative is to allow the students time to play with the manipulative and to get acquainted with them. They are as follows:

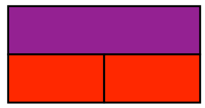




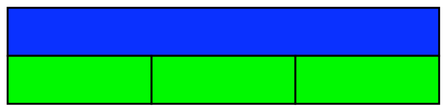
Orange = 10 white

Once this relationship has been established, the next step is to find relations between the different colors. This is accomplished using simple fractions like halves, thirds and fourths. This also allows the students to become familiarized with the concepts of simple fractions.

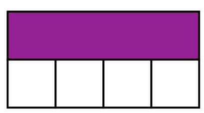
Example: Find half of a purple?
Since 2 reds = 1 purple, then
1 red is half of 1 purple.



Find one third of blue?
Since 3 greens = 1 blue,
1 green is one third of blue.



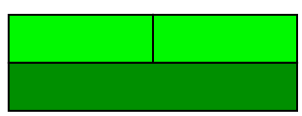
Find one fourth of purple?
Since 4 whites = 1 purple,
1 white is one fourth of purple.



This concept is further strengthened by going in the opposite direction and asking the students to go from part to whole instead of from whole to part.

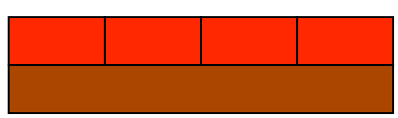
Example: Find the color for which green is half of?

Since green is half of some color,
then 2 greens = unknown color,
so the color is dark green.



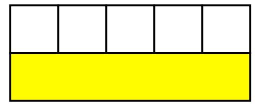
Red is one fourth of?

Since red is one fourth of some color, then 4 reds = unknown,
so the color is brown.



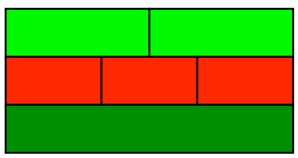
White is one fifth of?

Since white is one fifth of some color, then 5 whites = unknown, so the color is yellow.



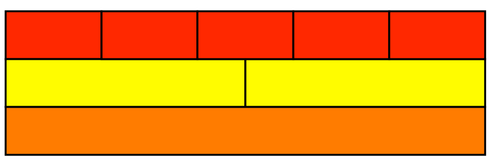
The next concept to consider would be that of least common multiple. The reasoning for this is of course due to needing common multiples to be able to add and subtract fractions. This concept is easy to teach as just forming trains of the same color rods and finding rods of equal length.

Example: What is the common multiple of 3(green) and 2(red)?



Since it takes 2 green and 3 red to represent the same length and it is represented by a dark green, then the multiple is 6(dark green is 6 white).

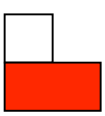
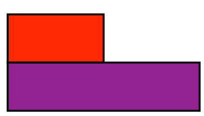
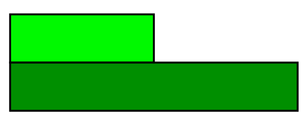
What is the common multiple of 2(red) and 5(yellow)?



Since it takes 5 red and 2 yellow to represent the same length and it is represented by an orange(10 white), then the multiple is 10

The next concept is equivalent fractions and basically, all that is involved is the comparison of different fractions to show that the ratios are the same.

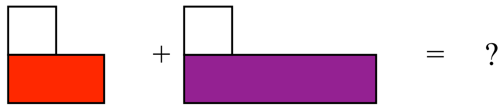
Example: one half and two fourths and three sixths.

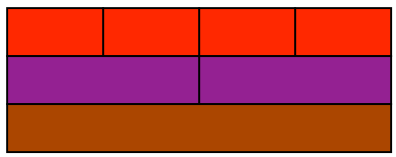
 and  and 

The top bar is half the size of the bottom bar.

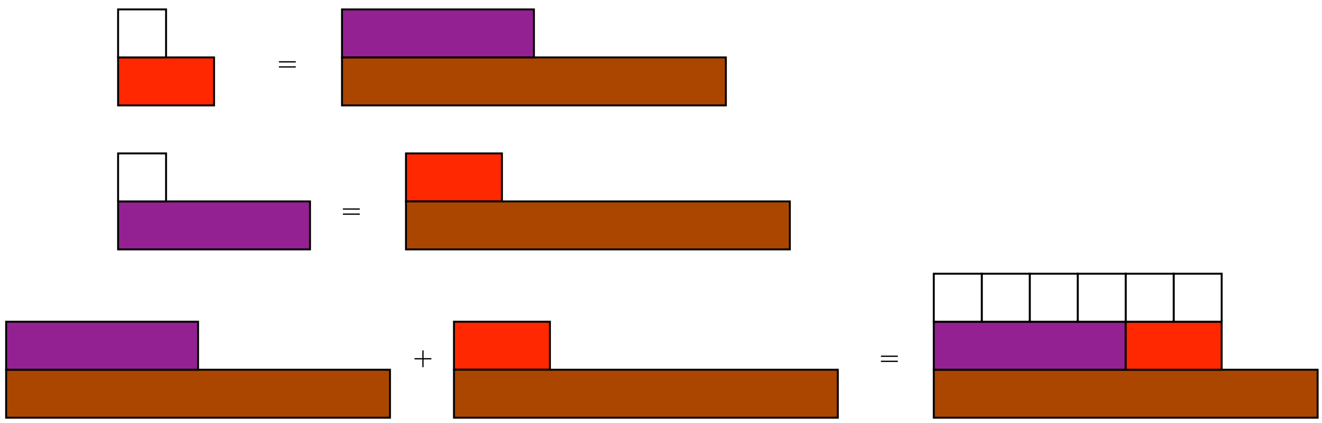
This concept leads into the actual adding and subtracting of the fractions. Start off slow and with easy numbers and build the complexity.

Example: one half plus one fourth.



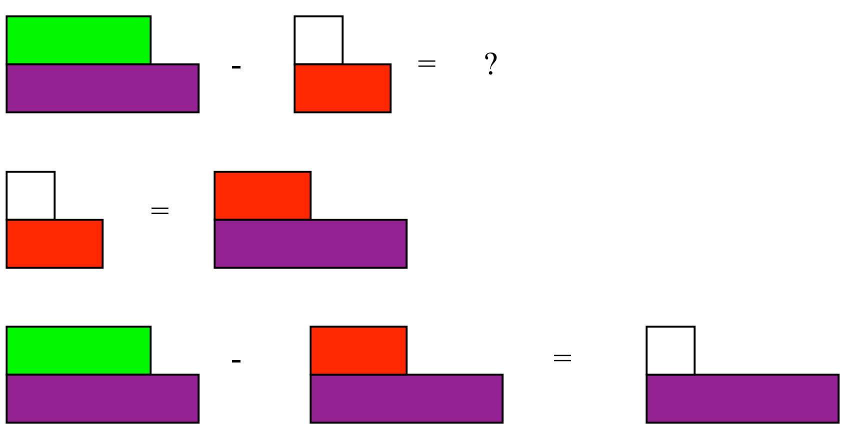


Common multiple is brown or 8.



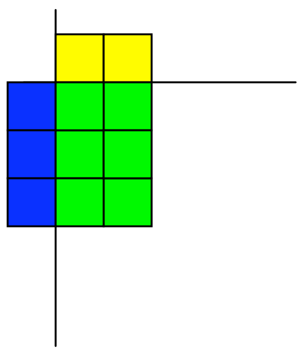
One half plus one fourth = six eighths
Then using equivalent fractions, we can simplify the fraction to three fourths.

Three fourths minus one half.



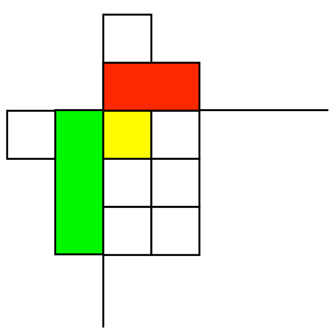
So three fourths minus one half = three fourths minus two fourths = one fourth.

Multiplication of fractions can be done in several different ways, but the one strategy that the students have found to be the easiest is one that I refer to as the area model, or the geometric model. This is the one that will be presented in this paper. In order to explain this model, first we must backtrack and talk about multiplication of whole numbers. Multiplication of whole numbers can be demonstrated in many ways. One that the students seem to understand the easiest involves finding the area of a rectangle.
Example: 2 x 3 Area of rectangle = length x width



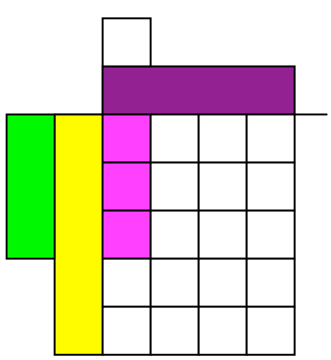
Length = 2 units
Width = 3 units
L x w = 2 x 3 = 6 square units

When multiplying fractions, the concept is the same. Take the fractions that we are working with and set them up in the same way, but stacked up in a 3-D manner.
Example: one half times one third



Length = 1/2
Width = 1/3
L x w = 1/2 x 1/3 = 1/6

1/4 x 3/5



Length = 1/4
Width = 3/5
L x w = 1/4 x 3/5 = 3/20