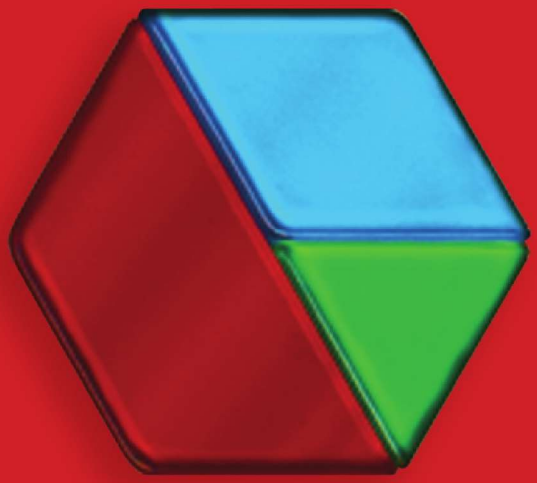
Developing Fractions Sense™

Student Workbook A

By Henry Borenson, Ed.D.



Student Name: _____

Teacher Name: _____

Grade: _____ Year: _____

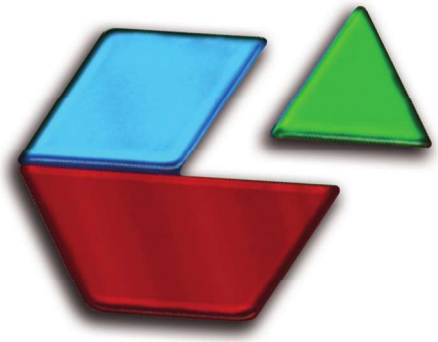
Dear Student:

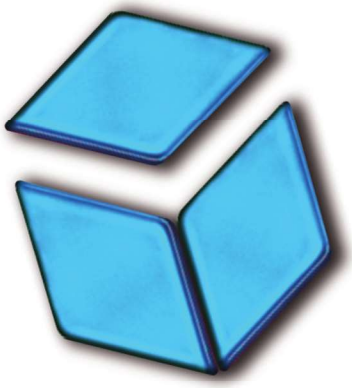
As you go through this workbook you will find that fractions are not so mysterious after all.

Our brains are quite remarkable. If we apply ourselves we will be amazed at how much we can achieve.

I wish you success and enjoyment in learning about fractions.

Thank you.
Dr. Henry Borenson





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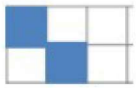
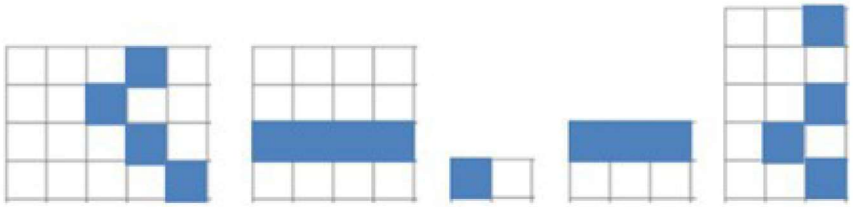
Lesson 5 Understanding Fractions: Rectangular Grids

The whole rectangular area below is partitioned into 6 equal small squares. Hence, each small square will be a unit fraction of size $\frac{1}{6}$. Since two small squares are shaded, the size of the blue section is $A = \frac{2}{6}$.



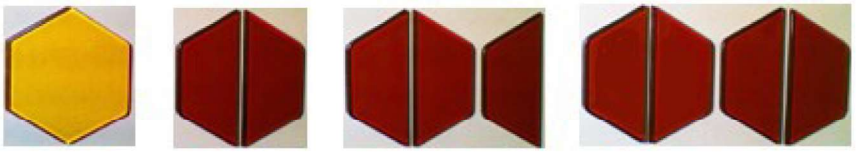
$A = \frac{2}{6}$

A. In each example below, write the fraction of the large rectangle that is shaded.



$A =$ $A =$ $A =$ $A =$ $A =$

B. Review Lesson #4: Given the yellow block as the whole, name each fraction. How many copies of the red block to you see? Keep in mind that each red block is $\frac{1}{2}$.



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What we have learned:

We can show fractions on a rectangular grid. For example, if a grid is made up of 12 equal parts then five of those parts indicate the fraction $\frac{5}{12}$ of the whole.

Lesson 13

Understanding Equivalent Fractions: Fraction Blocks Part III

If we consider the yellow block as the whole, then $R = \frac{1}{2}$ and $G = \frac{1}{6}$. We notice below that one red block is equal in size to three green blocks. We can write this fraction equality this way: $\frac{1}{2} = \frac{3}{6}$.

Let's consider the missing number in this equation: $\frac{5}{2} = \frac{\quad}{6}$. We can lay out 5 red blocks to represent the $\frac{5}{2}$, and then lay out as many green blocks as needed to have the same size. If we do this, we will see that we need 15 green blocks. Since each green block is $\frac{1}{6}$, 15 green blocks would be $\frac{15}{6}$. Hence, $\frac{5}{2} = \frac{15}{6}$.

Another approach is to realize that we need three times as many green blocks as red blocks for equality. Hence, given 5 red blocks, we need 15 green blocks to have the same size. However, 15 green blocks are $\frac{15}{6}$. Hence, $\frac{5}{2} = \frac{15}{6}$.

A. Complete each blank. You may use your fraction blocks.

a. $\frac{1}{2} = \frac{\quad}{6}$ **b.** $\frac{2}{2} = \frac{\quad}{6}$ **c.** $\frac{3}{2} = \frac{\quad}{6}$ **d.** $\frac{4}{2} = \frac{\quad}{6}$

B. Complete each blank by mentally visualizing the fraction blocks.

a. $\frac{\quad}{2} = \frac{15}{6}$ **b.** $\frac{\quad}{2} = \frac{18}{6}$ **c.** $\frac{\quad}{2} = \frac{21}{6}$ **d.** $\frac{\quad}{2} = \frac{24}{6}$

What we have learned:

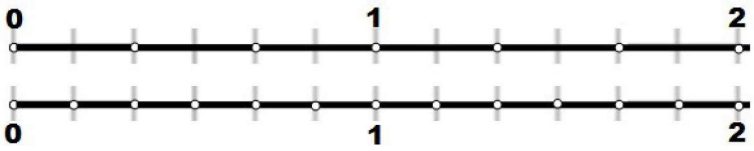
We need three times as many $\frac{1}{6}$ blocks as $\frac{1}{2}$ blocks to form equivalent fractions.

Examples: $\frac{1}{2} = \frac{3}{6}$ and $\frac{5}{2} = \frac{15}{6}$.

Lesson 21

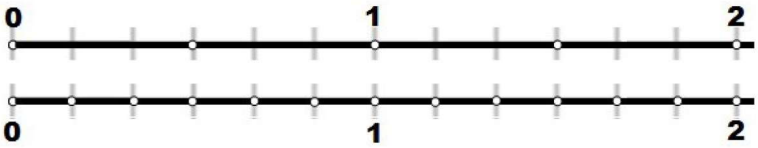
Understanding Equivalent Fractions: Number Line
Part V

A. On the number lines below locate and label the points: $\frac{2}{3}$, $\frac{4}{3}$, $\frac{4}{6}$ and $\frac{8}{6}$.



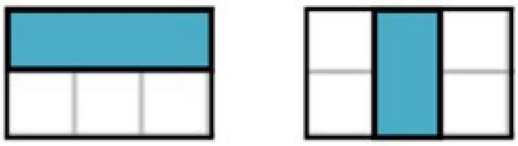
Next, complete each blank to form equivalent fractions: $\frac{4}{6} = \frac{\_}{3}$ and $\frac{8}{6} = \frac{\_}{3}$.

B. On the number lines below locate and label the points: $\frac{1}{2}$, $\frac{3}{2}$, $\frac{3}{6}$ and $\frac{9}{6}$.



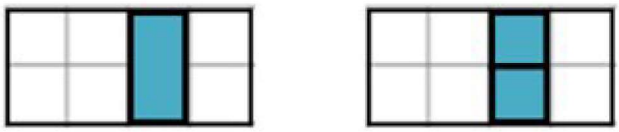
Next, Complete each blank to form equivalent fractions: $\frac{3}{6} = \frac{\_}{2}$ and $\frac{9}{6} = \frac{\_}{2}$.

C. Review: Name the shaded fraction in each rectangle. Are they equal?



a. ____ **b. ____**

D. Review: Name the shaded fraction in each rectangle. Are they equal?



a. ____ **b. ____**

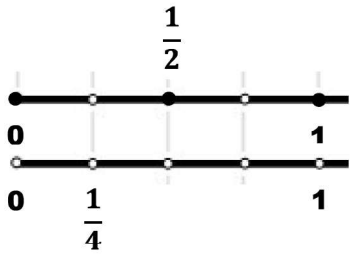
E. Review: Please complete each blank to form equivalent fractions.

a. $\frac{1}{2} = \frac{\_}{6}$ **b.** $\frac{2}{2} = \frac{\_}{6}$ **c.** $\frac{3}{2} = \frac{\_}{6}$ **d.** $\frac{4}{2} = \frac{\_}{6}$

Lesson 29

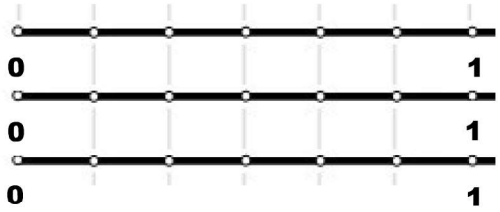
Comparing Unit Fractions with Different Denominators Part III

We see in the figure below that $\frac{1}{4} < \frac{1}{2}$, that is, the unit fraction with larger denominator is smaller.

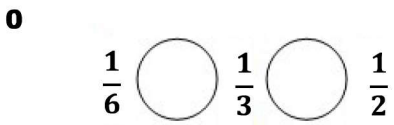


In general, the greater the number of parts that a whole is partitioned into, the smaller each part will be.

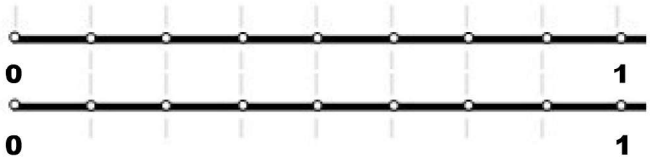
A. On the number lines below, locate the points $\frac{1}{6}, \frac{1}{3}$ and $\frac{1}{2}$.



B. Enter the symbol "<" or ">" in each circle.



C. On the number lines below label the points $\frac{1}{8}$ and $\frac{1}{4}$ to show $\frac{1}{8} < \frac{1}{4}$.



D. Review: Please complete each blank below to form equivalent fractions.

a. $\frac{\quad}{5} = 1$ **b.** $3 = \frac{3}{\quad}$ **c.** $\frac{2}{2} = \frac{\quad}{6}$ **d.** $1 = \frac{1}{\quad}$

Enrichment Lesson #1

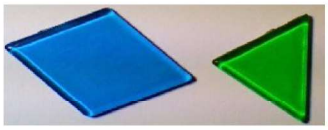
Considering Other Blocks as the Whole

Let's consider the red block below -- rather than the yellow block -- to be the whole. What fractional part of the whole is the green block now?

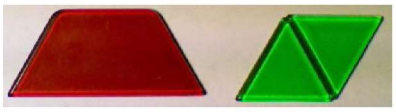
Below we see that 3 of the green blocks fill up the red block.

So, each green block is one-third of the red block. Therefore, if $R = 1, G = \frac{1}{3}$.

A. If the blue block is 1, what fraction is the green block?



B. If the red block is 1, what fraction are two green blocks?



C. If three red blocks are 1, what fraction is each red block?

D. If three red blocks are 1, what fraction is the green block?