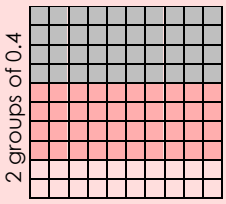
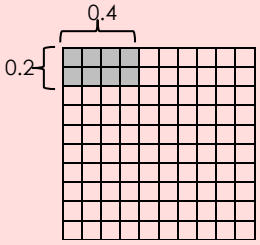
Packet 3: Decimal Operations

Dear Parents/Guardians,

Numbers in Base Ten Packet 3 explores operations with decimal numbers. In Lesson 1, students review the standard algorithms for addition and subtraction and apply this to balancing a checkbook. In Lesson 2, students explore different methods for multiplying decimals to help make sense of the standard algorithm. In Lesson 3, students use their knowledge of whole number division to make sense of decimal division.

Multiplying Decimals Using Visual Models

Students revisit the base-10 blocks and fraction equivalence from Packet 2 to look at patterns with multiplying decimals and make sense of the standard algorithm.

Equations	Visual
$2(0.4) = 0.8$ $2\left(\frac{4}{10}\right)=\frac{8}{10}$	☐ represents 0.01 (one-hundredth) of the figure.  Each row is 0.1 (one-tenth) of the figure. Students shade in 2 groups of 0.4 and visually see that the total is 0.8 of the figure.
$0.2(0.4) = 0.8$ $\frac{2}{10}\left(\frac{4}{10}\right)=\frac{8}{100}$	☐ represents 0.01 (one-hundredth) of the figure.  Using an area model, students find the area of the rectangle with dimensions 0.2 and 0.4.

Seeing Patterns with Multiplying Decimals

Students work with patterns in multiplication to determine the proper decimal notation.

$3(6) = 18$	
$3(0.6)=1.8$ $3(0.06)=0.18$ $3(0.006)=0.018$	$0.3(6)=1.8$ $0.03(6)=0.18$ $0.003(6)=0.018$
$0.3(0.6)=0.18$ $0.03(0.6)=0.018$ $0.03(0.06)=0.0018$	

Notice the digits 18 are in every product. The location of the 18 is determined by the place value of the numbers being multiplied.

Dividing Decimals Using Fraction Notation

One way students can make sense of the standard algorithm for decimal division is to create equivalent fractions with denominators of tenths, hundredths or thousandths.

$4\div5$	$3\div8$
$\frac{4}{5}\times\frac{2}{2}=\frac{8}{10}$ $\frac{8}{10}=0.8$	$\frac{3}{8}\times\frac{125}{125}=\frac{375}{1000}$ $\frac{375}{1000}=0.375$

NUMBERS in BASE TEN PACKET 3

By the end of the packet, your student should know…

- How to add and subtract decimals using the standard algorithm Lesson 3.1
- How to multiply decimals using various models Lesson 3.2
- How do divide decimals using various strategies Lesson 3.3

Additional Resources

- For definitions and additional notes please refer to section 3.5.
- For a video tutorial on using the traditional algorithm for decimal addition or subtraction: https://youtu.be/raOP-2iy0pA
- For a video tutorial on converting fractions to decimals through division: https://youtu.be/do_lbHId2Os
- For a video tutorial on using the traditional algorithm for decimal division: https://youtu.be/lpMMJESyDjU