Decimals (Concepts of Decimals)

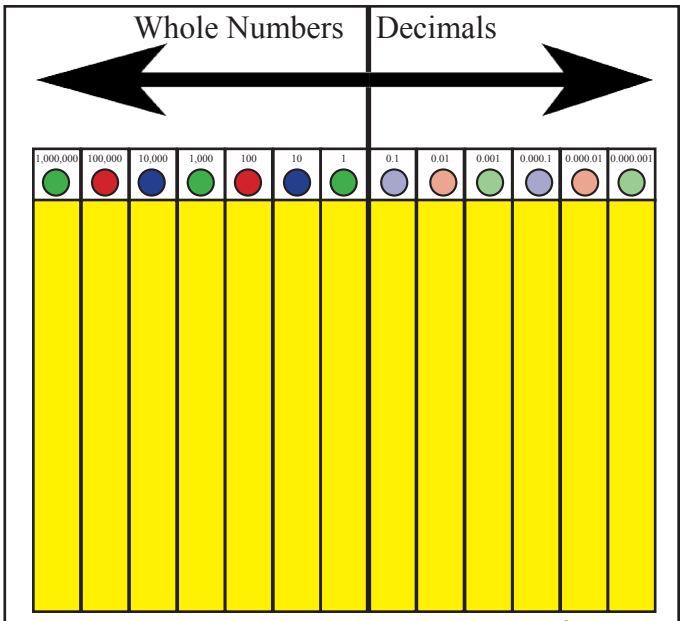


Figure 8.

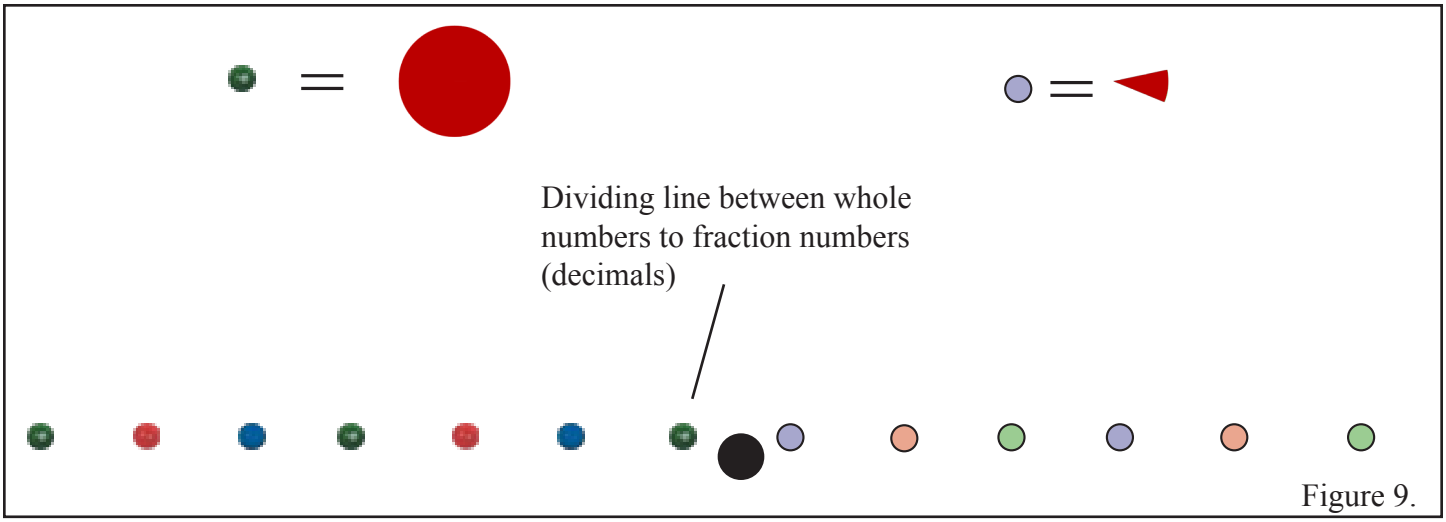


Figure 9.

1 unit bead becomes 10 tenths pieces. Shows the relationship between 10s and tenths.

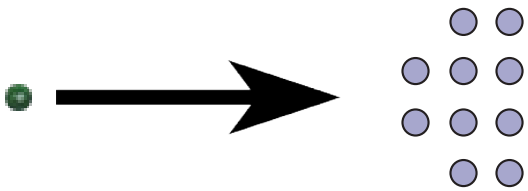


Figure 10.

Decimals (Decimal Symbols)

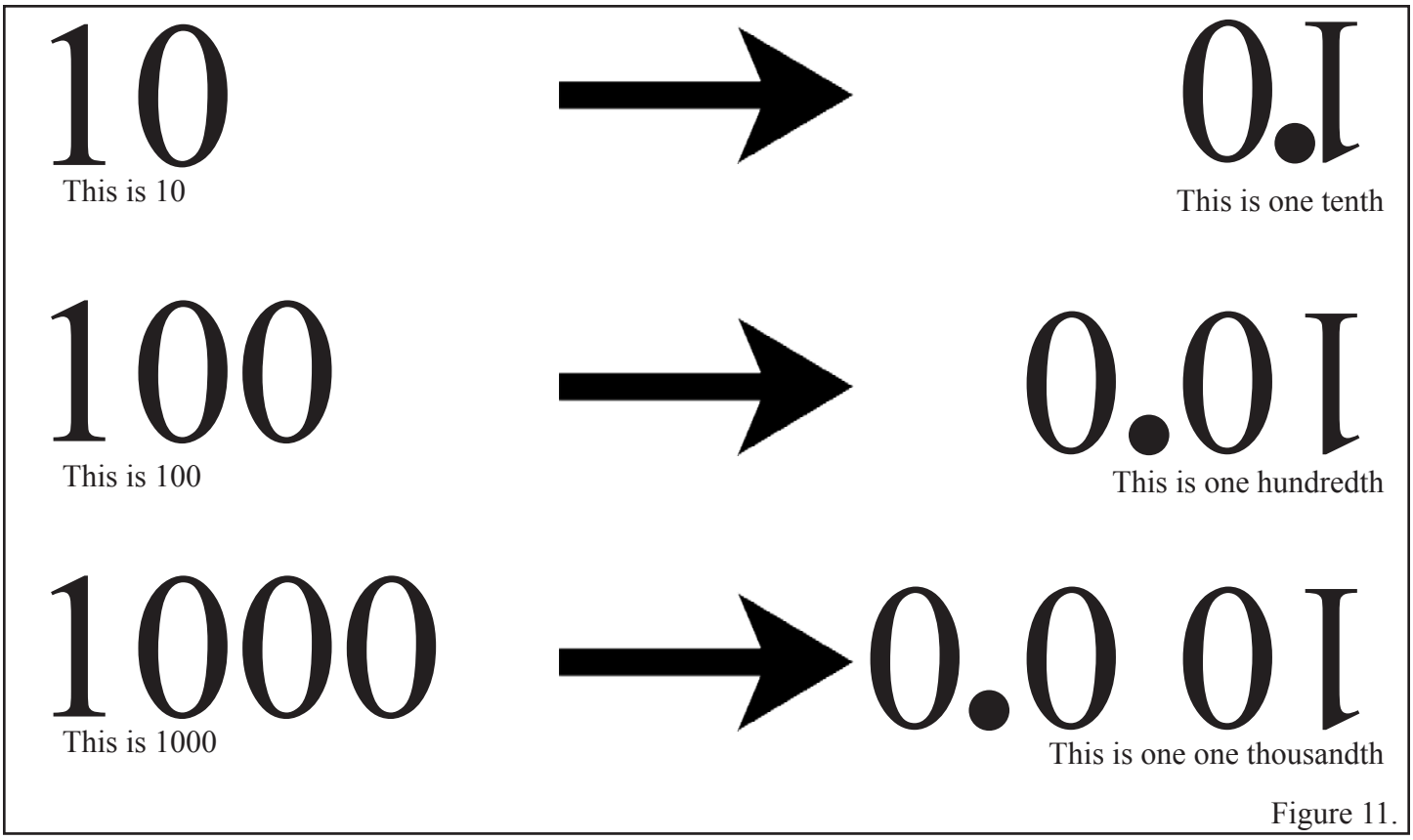


Figure 11.

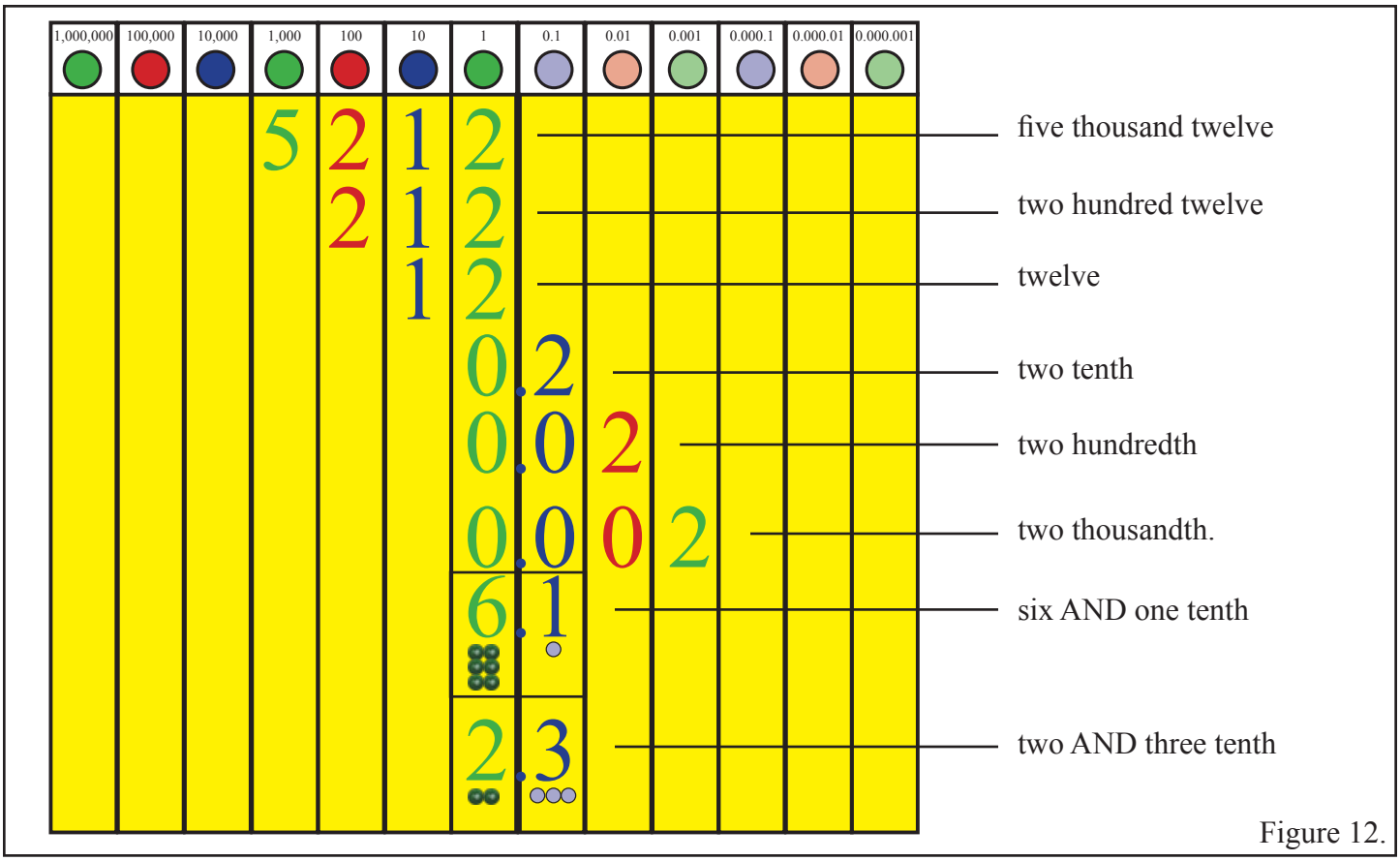
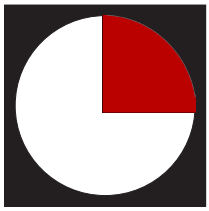
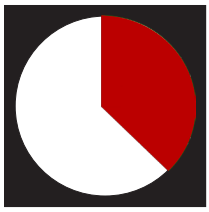


Figure 12.

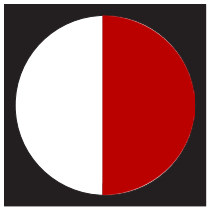
Centecimal Frame (decimal converter).



1/4 = 25 / 100 = .25



1/3 = 33 / 100 = .33



1/2 = 50 / 100 = .5

Centecimal Frame (decimal converter) - This has 100 ticks around the outside. You can put the different fractions intot he grame and it will tell you the amount out of 100. In tern you can change it into a fraction from there.

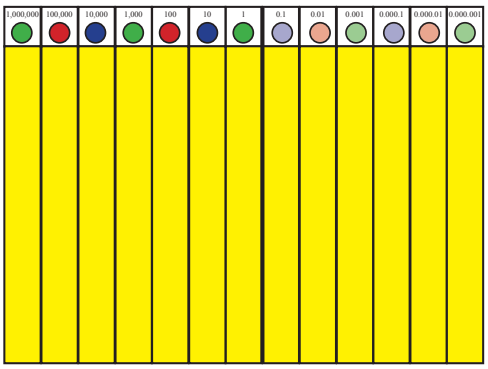
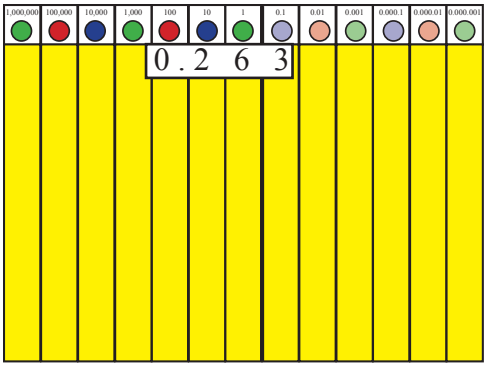


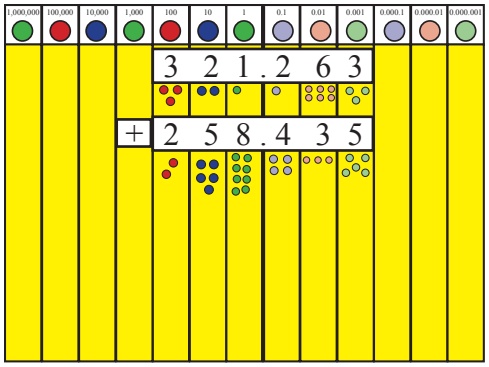
Table of Hierarchies

Addition and Subtration of Decimal Numbers.

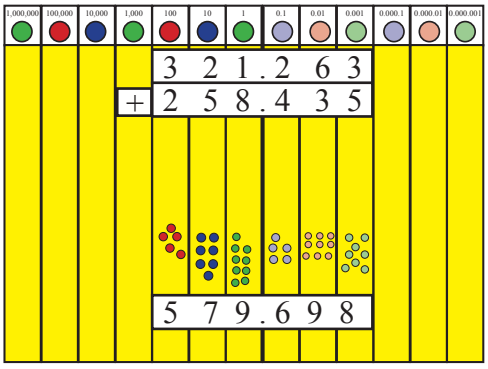
$$\begin{array}{r} 321.263 \\ -\ 258.435 \\ \hline 579.698 \end{array}$$



Have teh students grab the numbers from the bank game. Lay down the decimal part first.

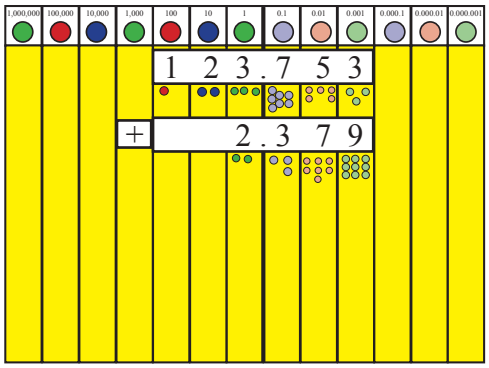


Lay out second addent and the beads on the board.

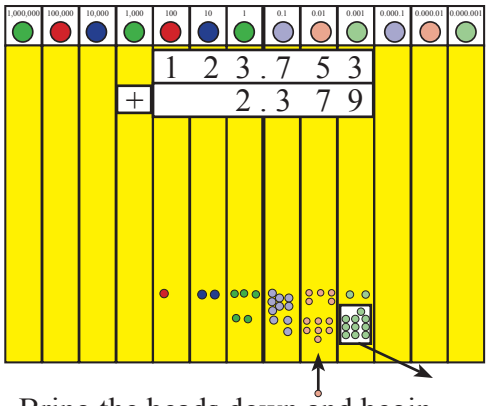


Combine the collumns.

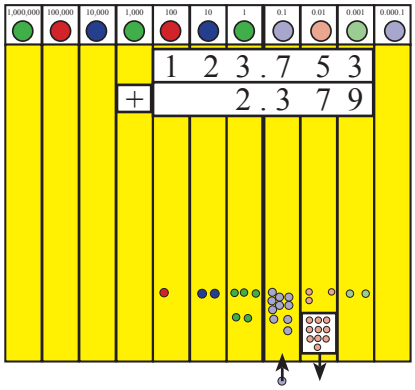
$$\begin{array}{r} 123.753 \\ -\quad 2.379 \\ \hline 126.132 \end{array}$$



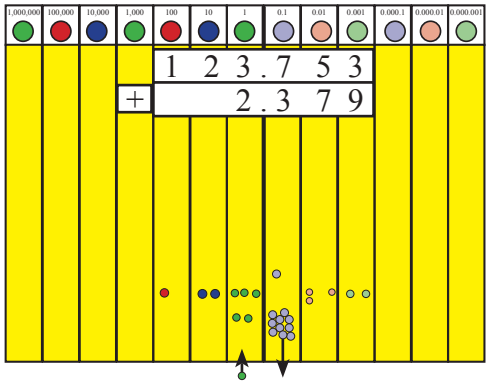
Lay out the two numbers and the beads the coorispond to the different numbers. Having the children say the numbers as they do it.



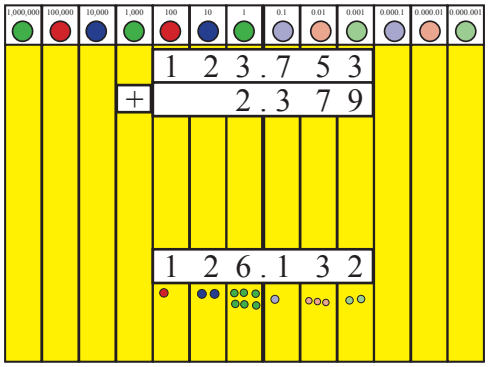
Bring the beads down and begin to simplify. When we reach 10 we need to substitute. Begin with smallest column.



Continue to simplify

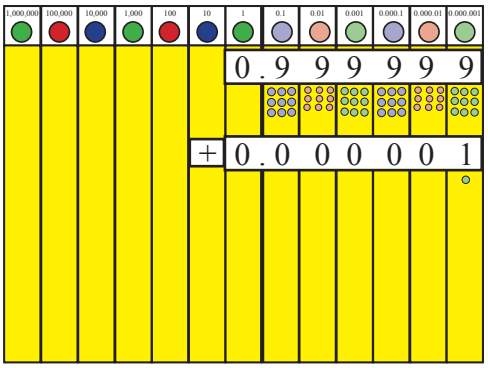


Continue to simplify

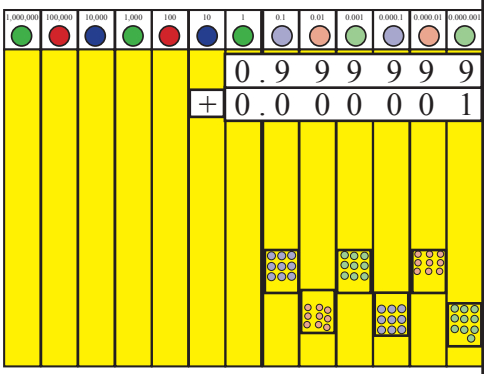


Put units down for the answer.

$$\begin{array}{r} 0.999999 \\ -\ 0.000001 \\ \hline 1.000000 \end{array}$$

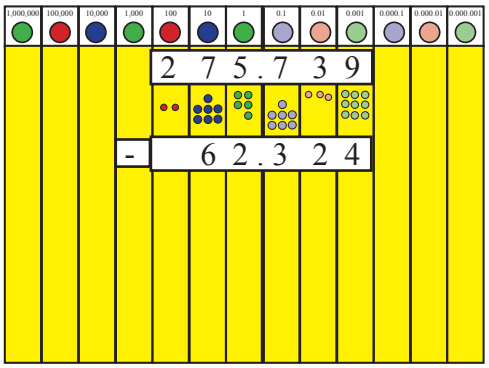


Lay out numbers and add them together.

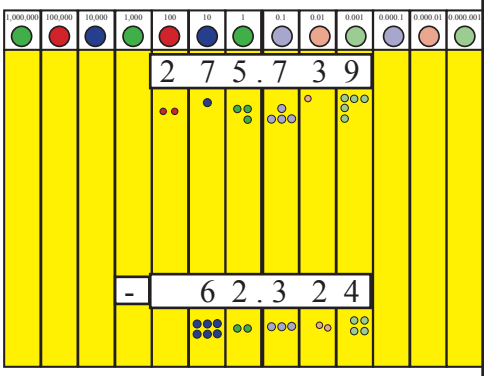


Add and exchange when needed.

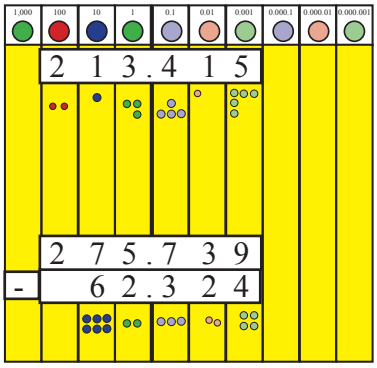
$$\begin{array}{r} 304.037 \\ -\ 197.149 \\ \hline 275.739 \end{array}$$



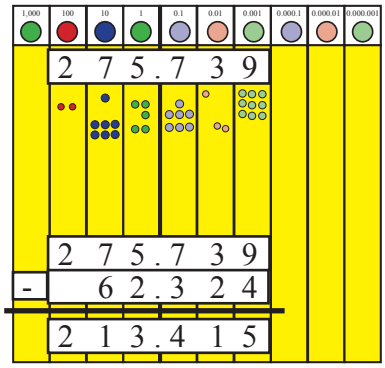
Lay out the number and teh suprahend.



Take away the number of beads and place below sebtrahend (62.324).

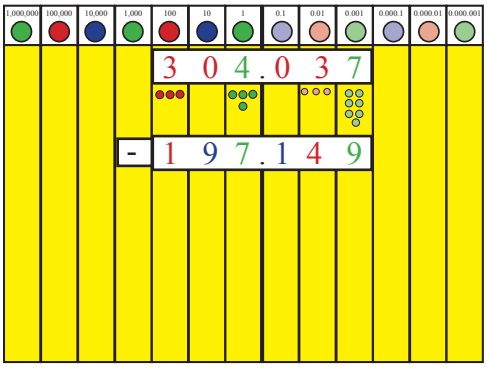


The number remaining above teh sebtrahend is the answer. Place the minuend above teh subtrahend and place cards for the answer

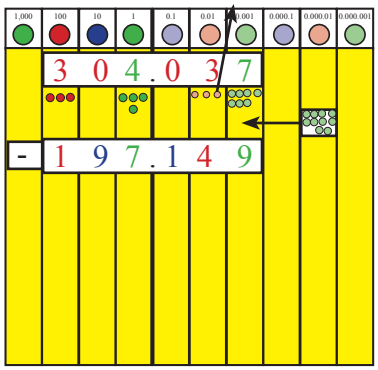


To check we add the number together again and see if we have the minuend.

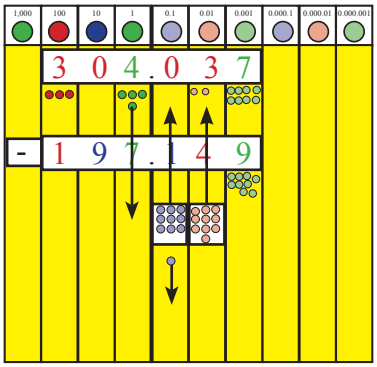
$$\begin{array}{r} 304.037 \\ -\ 197.149 \\ \hline 106.888 \end{array}$$



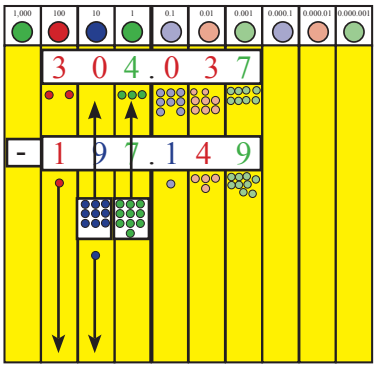
Lay out Minuend, beads for minuend and lay out subtrahend number (no beads).



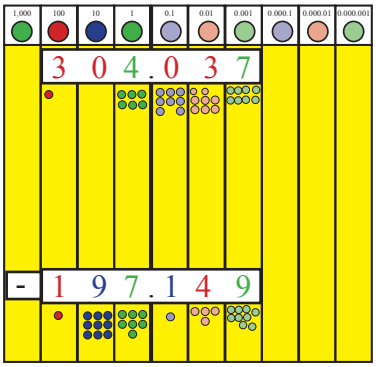
Since we can not take 7 from 9 we exchange a for 10. Then subtract.



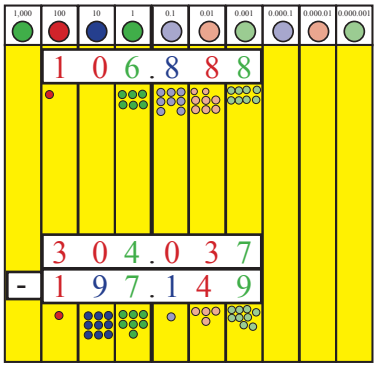
Since we can not take 2 from 4 and we can't borrow from the tenths, we need to go to the units.



Continue to subtract. Since we cannot take 7 from 3 we have to borrow from the 100s since there are no 10s.

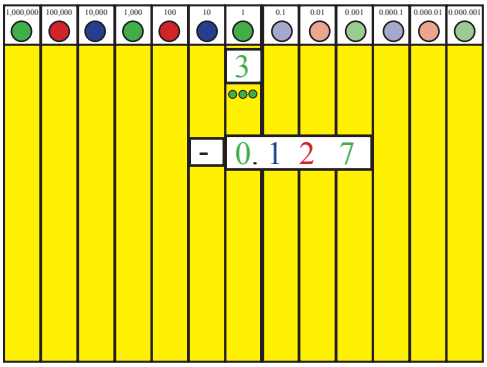


Continue to subtract. Bring down the subtrahand and the minuend

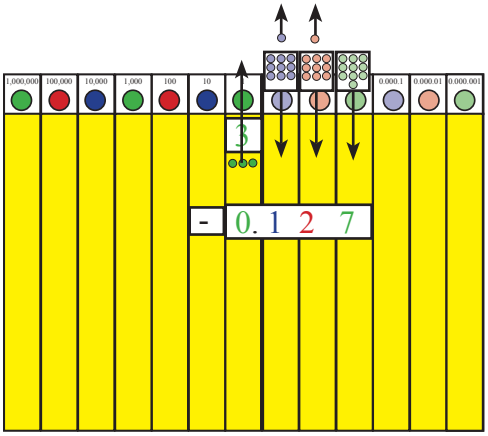


Place the tiles out for the reamaining beads. To check your answer add the two beads together again.

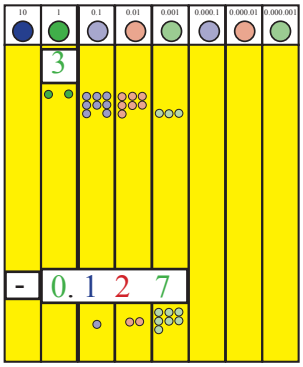
$$\begin{array}{r} 3.000 \\ -\ 0.127 \\ \hline 2.873 \end{array}$$



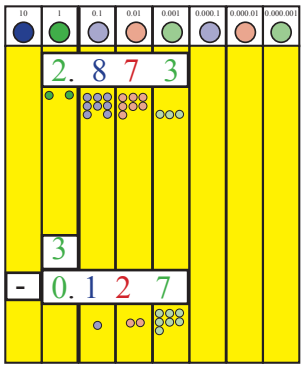
Lay out Minuend, beads for minuend and lay out subtrahend number (no beads).



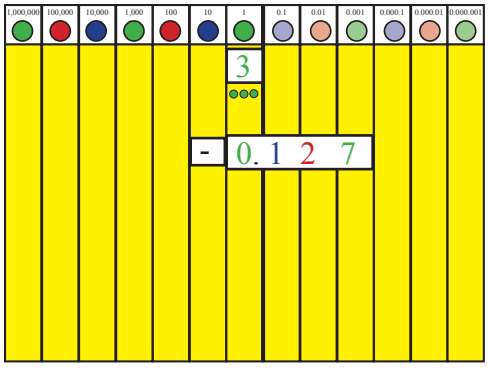
Since we can not take 7 from 0 we need to borrow all the way to the units.



Now subtract



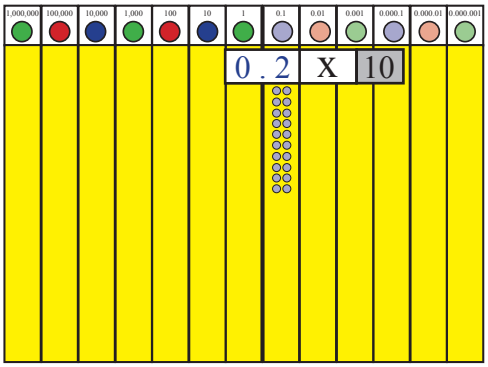
Bring the minuend down and put the answer tiles out.



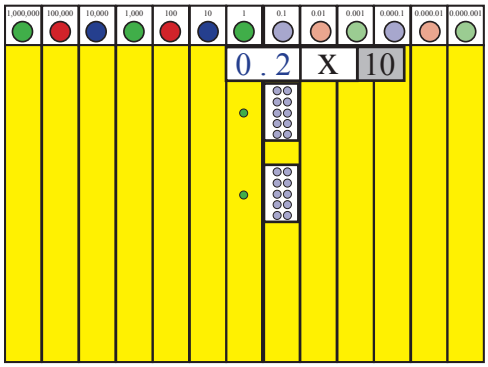
To check your answer, add the beads back together and you should get the minuend.

Multiplication of Decimal number by 10

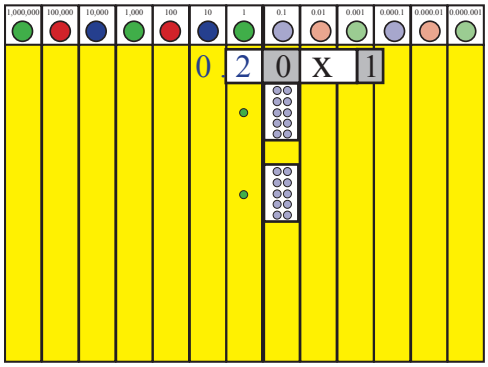
$$\begin{array}{r} 0.2 \\ \times\ 10.0 \\ \hline 2.0 \end{array}$$



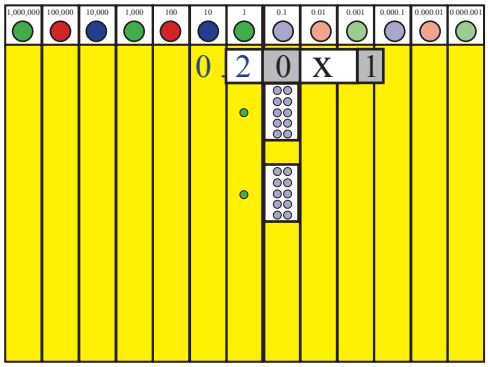
Lay out the tiles on the board (in this specific order). Begin by taking 0.2 ten times.



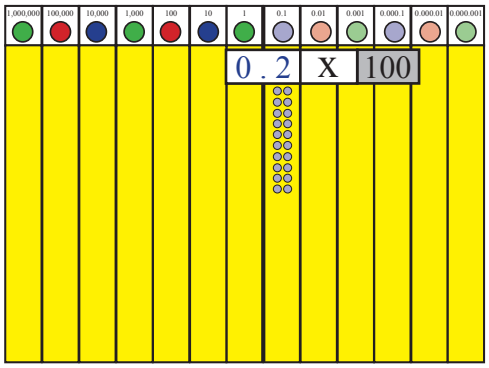
For every 10 exchange for a unit bead.



You can also point out that if you multiply something by 10 its the number you started with a zero behind it (disregard the decimal point and colors of the number).

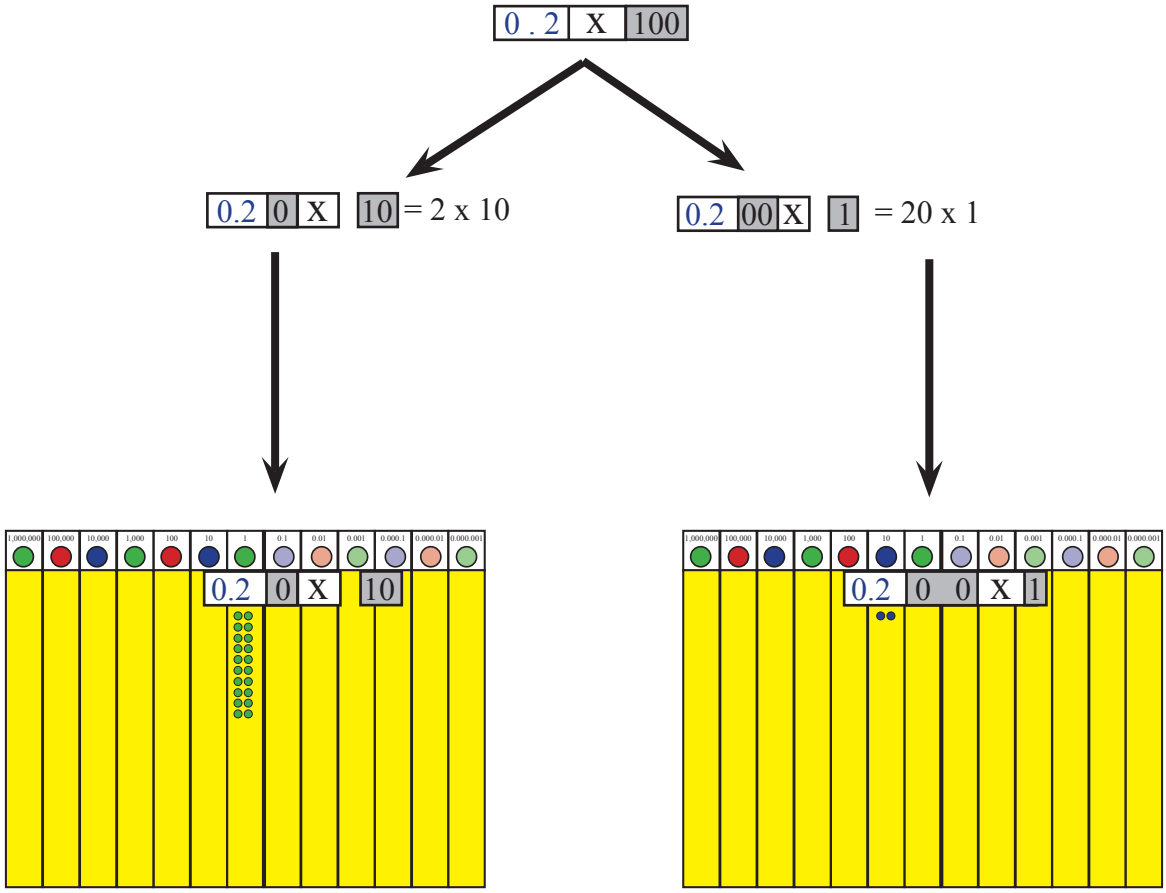


From our multiplication facts we know anything taken 1 time is itself. So: 2.0 x 1 = 2



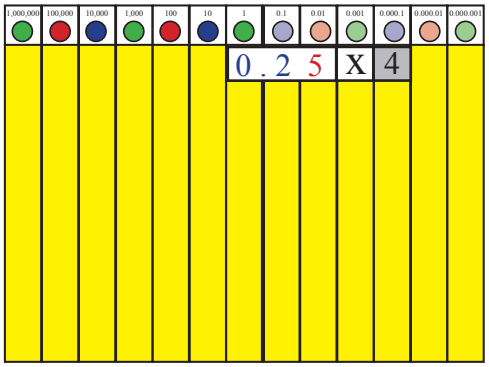
$$\begin{array}{r} 0.2 \\ \times\ 100.0 \\ \hline 20.0 \end{array}$$

Can lay out .2 100 times or you can write the problem 2 different ways.

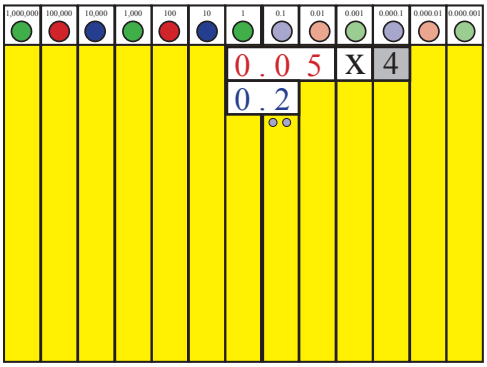


Either way we know that the answer is 20.

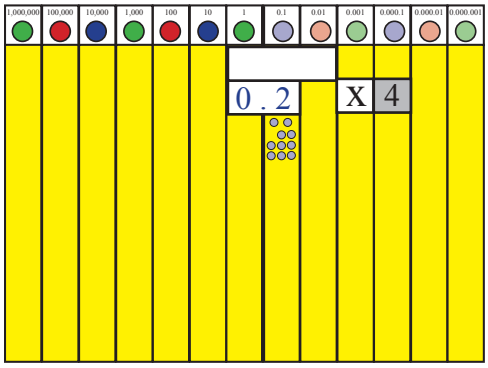
$$\begin{array}{r} 0.25 \\ \times \quad 4.0 \\ \hline 1.0 \end{array}$$



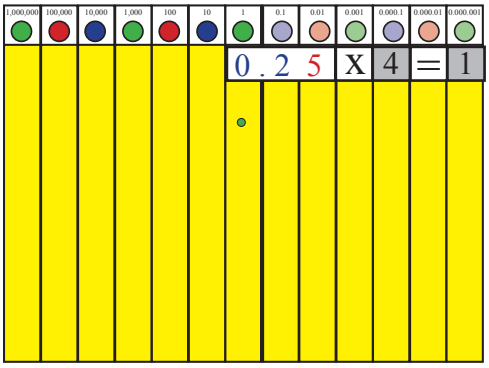
Lay out the problem



Now lay out the problem
in expanded mode. Multiply the
smallest diget and lay out the beads.

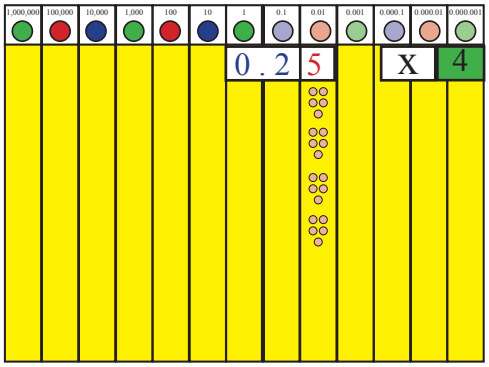


Turn card over. Move down the X
and 4. Multiply out.

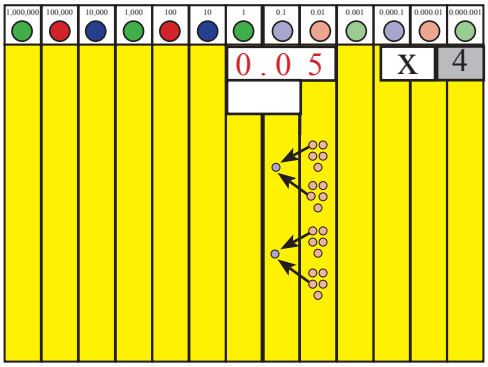


Add products together and simplify.
Put the problem back together.

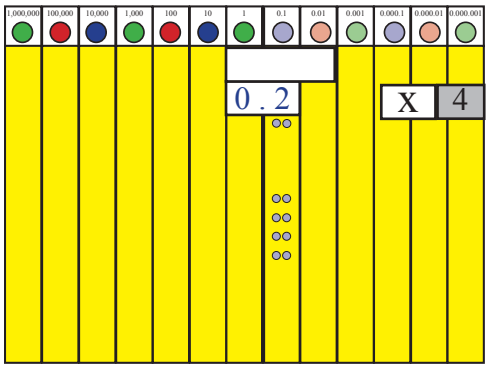
$$\begin{array}{r} 0.25 \\ \times\ 4.00 \\ \hline 1.00 \end{array}$$



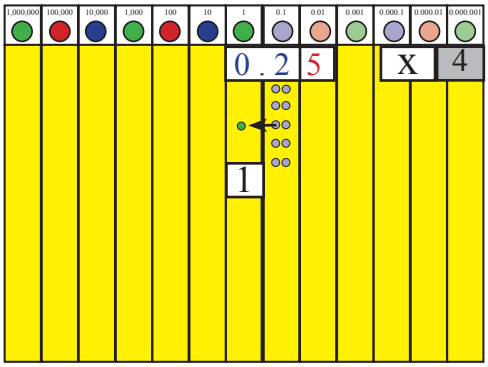
Lay out tiles and begin by taking five hundredth 4 times.



Exchange every 10 hundredth beads place a single tenth

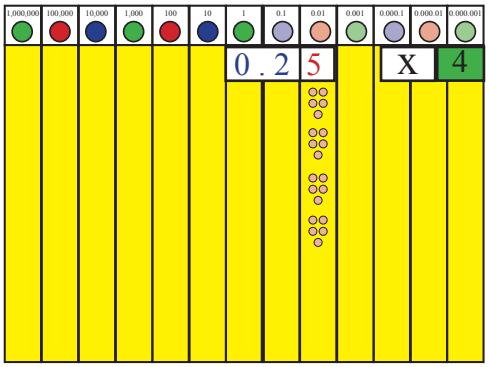


Now take two tenths 4 times. Keep the existing 2 tenths on the board from previous problem.

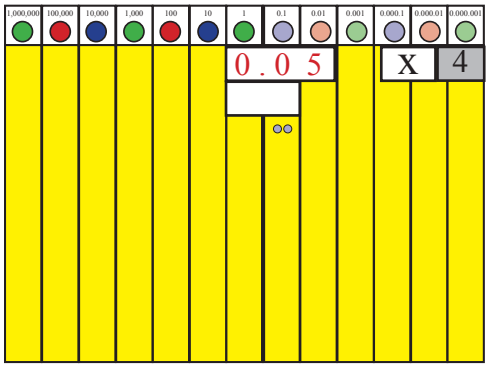


Combine and we come up with the number 1.

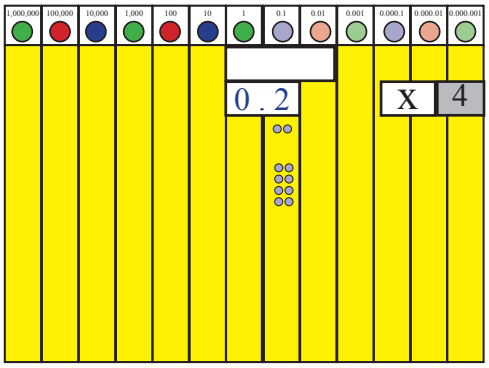
$$\begin{array}{r} 0.25 \\ \times\ 4.00 \\ \hline 1.00 \end{array}$$



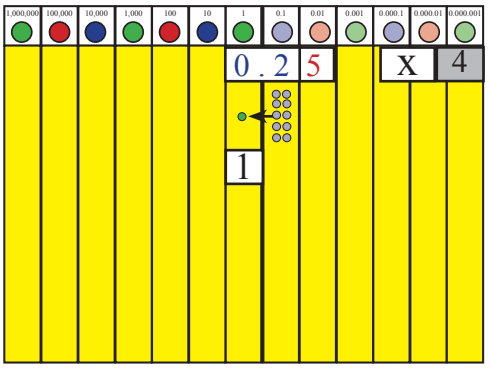
Lay out tiles and begin by breaking down the numbers.



Since we know that 4 x 5 is 20 we know that .05 x 4 is .2. Lay out 2 tenths.

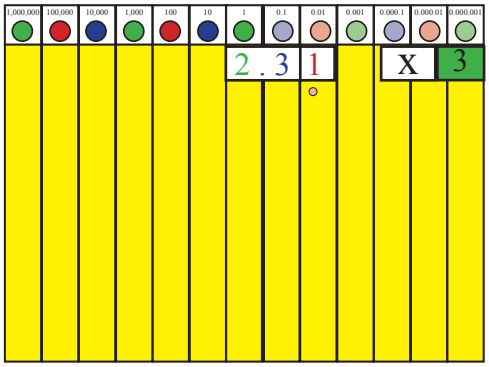


Since we know that 4 x 2 is 8 we know that .2 x 4 is .8. Lay out eight tenths.

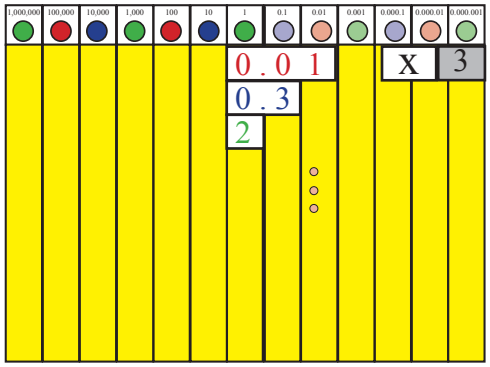


Exchange and we know the final number is 1.

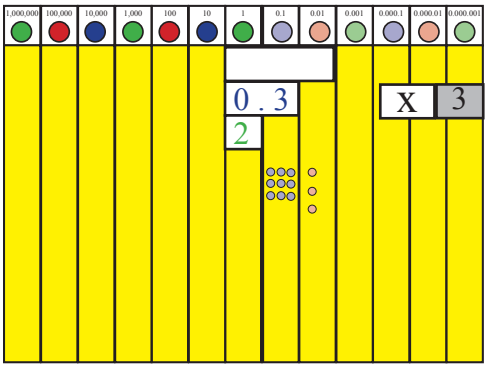
$$\begin{array}{r} 2.31 \\ \times\ 3.00 \\ \hline 6.93 \end{array}$$



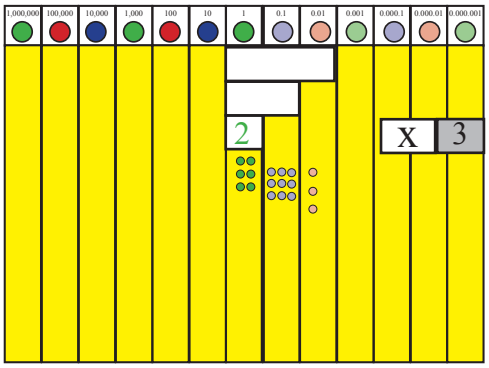
Lay out tiles and begin by breaking down the tiles.



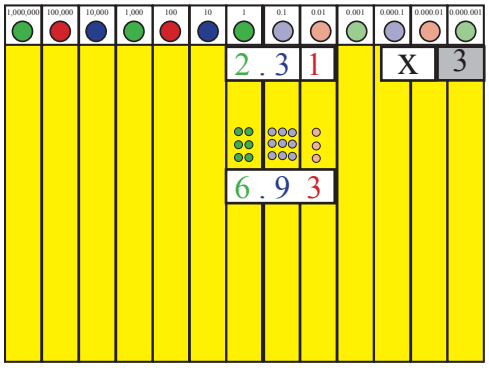
Now take 0.01 three times.



Flip over the 0.01 card and now take 0.3 three times.



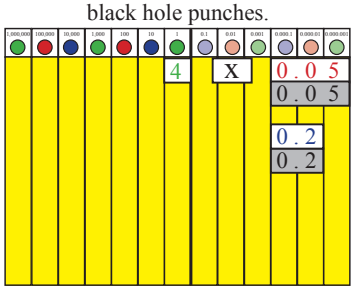
Flip over the 0.3 card and now take 2 three times.



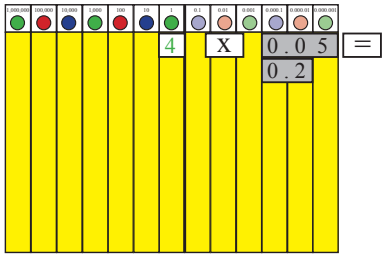
Lay out tiles and begin by breaking down the tiles.

$$\begin{array}{r} 4.00 \\ \times\ 0.25 \\ \hline 1.00 \end{array}$$

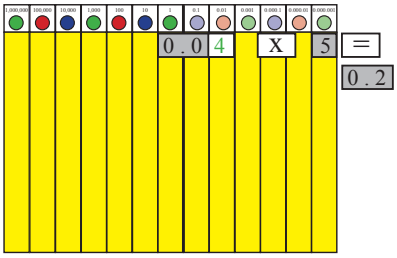
Decimal point for gray tiles are black hole punches.



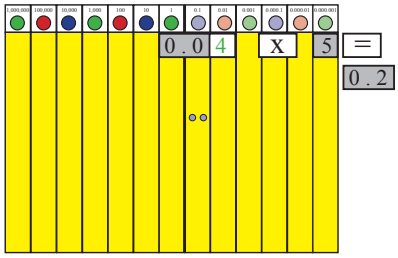
Lay out tiles. Break down the multiplier symbol. and exchange for a gray



Now break down the multiplier. and multiply the smallest figure on the board (4 x 0.05). Place the 0.2 over off the board.

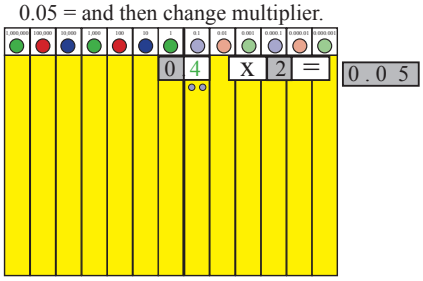


Use magic zero to push the 4 to the hundredth place.

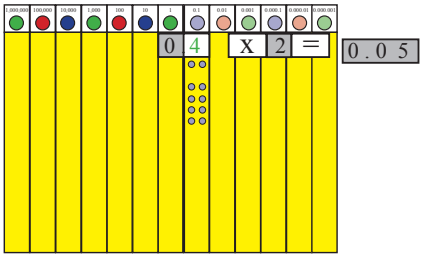


Now multiply 0.04 x 5. We get 0.2.

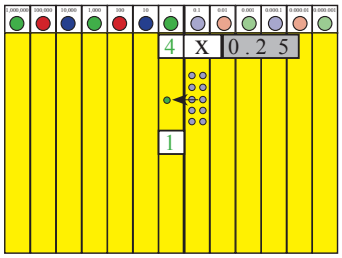
Note: place the problem back to 4 x 0.05 = and then change multiplier.



Place the 0.05 off the board and do the same steps with the 0.2.



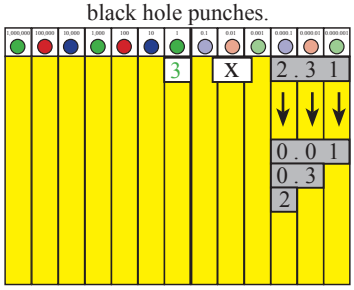
Now take 0.4 2 times to get eight tenths or (0.8)



Combine answer, place problem back to original and place tiles out for answer.

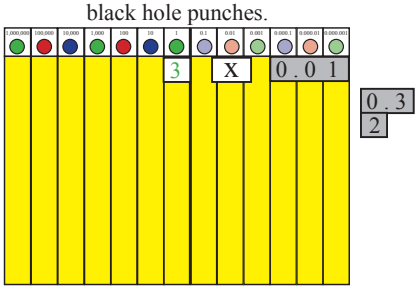
$$\begin{array}{r} 3.00 \\ \times\ 2.31 \\ \hline 6.93 \end{array}$$

Decimal point for gray tiles are black hole punches.



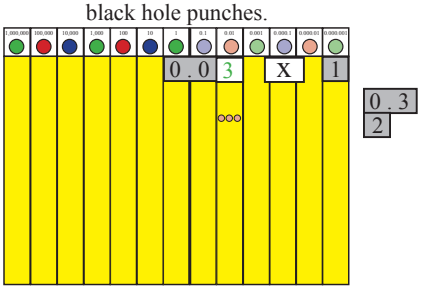
Lay out tiles. Break down the multiplier symbol using gray tiles.

Decimal point for gray tiles are black hole punches.



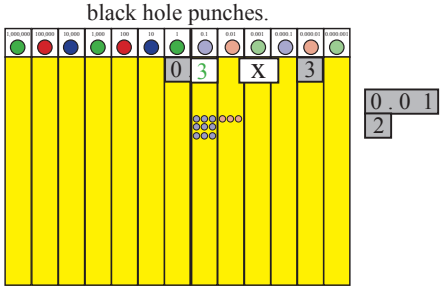
Place the 0.3 and 2 off to the side. Using magic zero move the 3 to the hundredth place.

Decimal point for gray tiles are black hole punches.



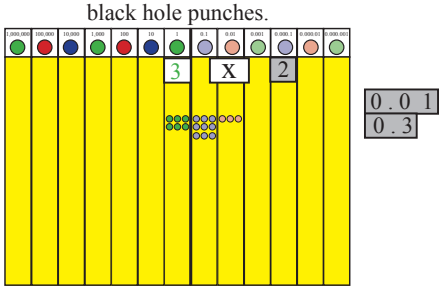
Multiple and get 0.03. Exchange gray cards and place 3 back in units spot.

Decimal point for gray tiles are black hole punches.



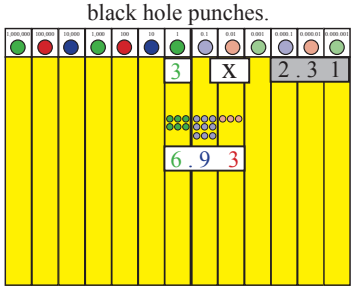
Multiple and get 0.9. Place the beads down. Exchange gray cards and place 3 back in units spot.

Decimal point for gray tiles are black hole punches.



Now multiply 3 x 2 to get 6.

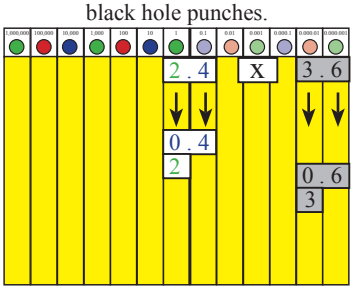
Decimal point for gray tiles are black hole punches.



Place the problem back together, count up your answer and place tiles out.

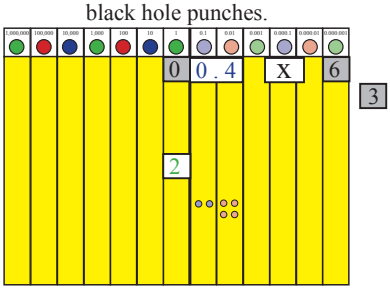
2.4 x 3.6 = 8.64

Decimal point for gray tiles are black hole punches.



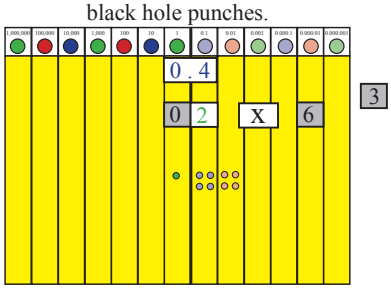
Lay out tiles. Break down both numbers. Create symbols for multiplier using gray tiles.

Decimal point for gray tiles are black hole punches.



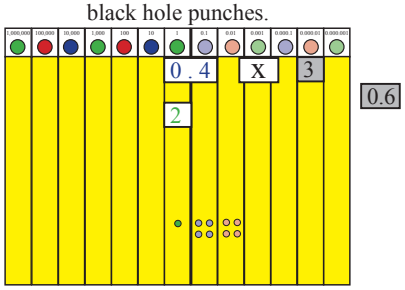
Using the magic zero push the 4 to the hundredth place. Multiply.

Decimal point for gray tiles are black hole punches.



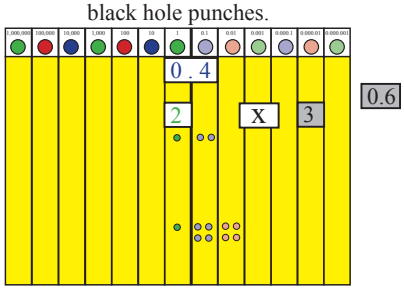
Put 0.4 back to proper spot. Using the magic zero push the 2 to the tenth place. Multiply.

Decimal point for gray tiles are black hole punches.



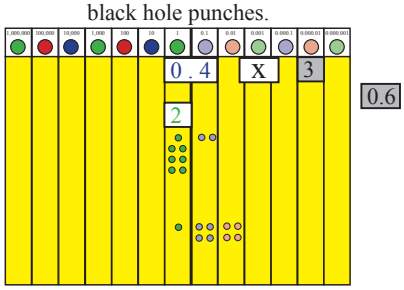
Reset the multiplicand and place three on board and place 0.6 off to side.

Decimal point for gray tiles are black hole punches.



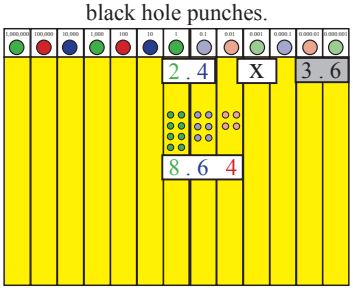
Multiply the 3 by 0.4 and get 1.2

Decimal point for gray tiles are black hole punches.



Multiply the 3 by 2 and get 6

Decimal point for gray tiles are black hole punches.



Put problem back together, count up beads and place tiles in appropriate place.