

Goals:

- Demonstrate multiplication of decimals with drawings and concrete models
- Solve real world problems involving multiplication of decimals

Prerequisite Knowledge

- Understand multiplication as groups, arrays, and areas
 - Familiar with base-ten block representation of decimal numbers
 - Know multiplication facts up through 9×9
-

Activities:

1. Whole Class Discussion: Given the problem $5 * 2$, how many different ways can we show (through drawing) this multiplication problem?
2. We will be doing the following problem twice. The first time will be teacher led presentation through the problem. The second time through the problem, you will be tasked with replicating what you just witnessed. The space provided below is for you to use on your attempt at the problem. With a partner,
 - a. Represent the problem 1.1^2 using base-ten blocks. Draw your findings below.

b. Find the result using the least number of base-ten blocks. Draw your findings below.

c. Compute 1.1^2 using the paper-and-pencil method. Relate this result to your drawings above.

- d. Jessie computed and arrived at the result of 12.1. How did Jessie arrive at this answer? Is this a reasonable answer? Why or why not?

3. Consider the following scenario:

Mandy is going to bring apples to their Halloween block party for the kid's bobbing for apples game. They buys 2.5 pounds of apples that cost \$1.30 per pound. What is the total cost for the apples (note: in Wisconsin, there is no tax on food items)?

- a. Solve the problem using base-ten blocks.
- b. Draw your findings. What is the result?

- c. Work out the problem using the paper-and-pencil partial-products method. Be prepared to share your work with the class.

- d. Whole Class Discussion: How do the base-ten blocks relate to the paper-and-pencil method?

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Lesson Materials:

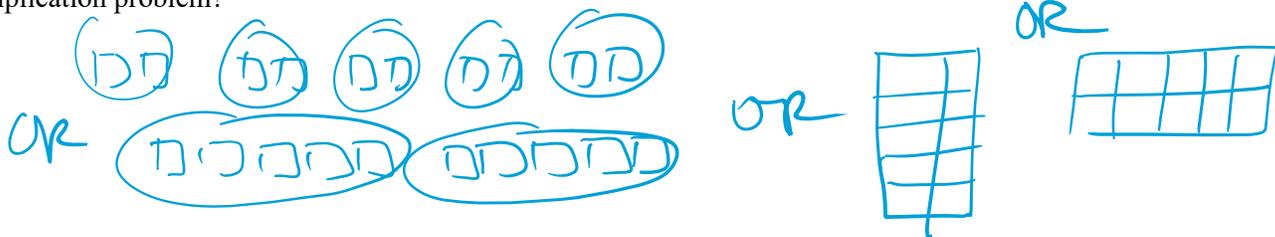
- Student Notes for Day 11
- Base-ten blocks, if students would like to use them. Prefer them to be drawing at this stage.

Lesson Breakdown:

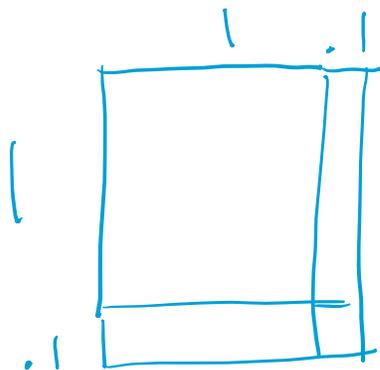
Activity	Size of Group	Time in Activity Total Time: 55 minutes
5*2 Different Representations	Whole Class Discussion	10 minutes
1.1 ² Partial Products Method	Teacher-led discussion	10 minutes
1.1 ² Partial Products Method	Partners	10 minutes
Mandy's Problem	Partners, then whole-class discussion	15 minutes
12.01(2.4) Problem	Individually	10 minutes

Activities:

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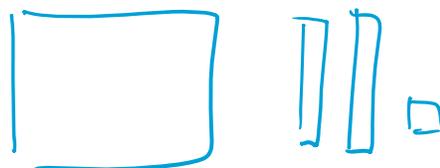


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- Represent the problem 1.1^2 using base-ten blocks. Draw your findings below.



- Find the result using the least number of base-ten blocks. Draw your findings below.

1.21



- c. Compute 1.1^2 using the paper-and-pencil method. Relate this result to your drawings above.

$$\begin{array}{r}
 1.1 \\
 \times 1.1 \\
 \hline
 11 \\
 10 \\
 10 \\
 100 \\
 \hline
 121
 \end{array}$$

1×1
 1×10
 10×1
 10×10

$\sqrt{121}$
 11

1.21

move 2 places from right to left

- d. Jessie computed and arrived at the result of 12.1. How did Jessie arrive at this answer? Is this a reasonable answer? Why or why not?

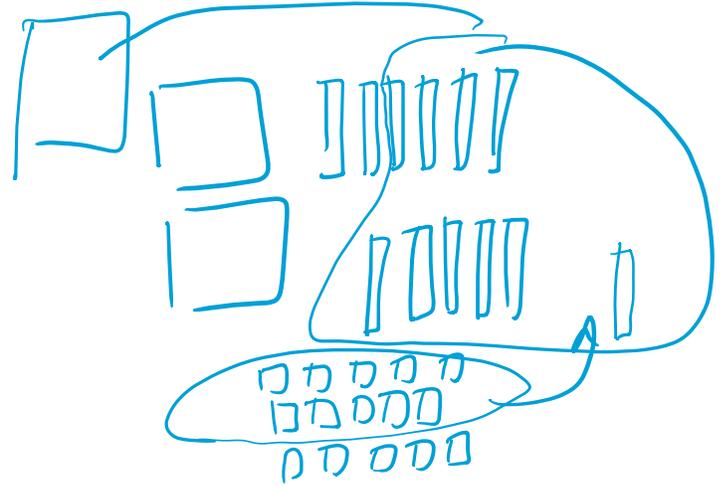
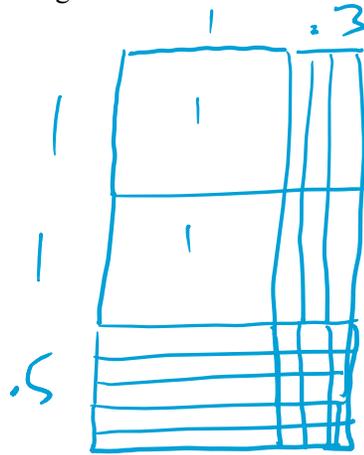
$$\begin{array}{r}
 1.1 \\
 1.1 \\
 \hline
 12.1
 \end{array}$$

most likely lined up the decimal & brought it straight down as in addition.

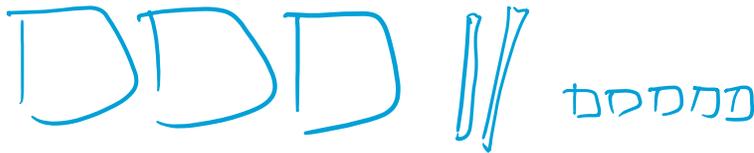
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- a. Solve the problem using base-ten blocks.
- b. Draw your findings. What is the result?



TRADES:

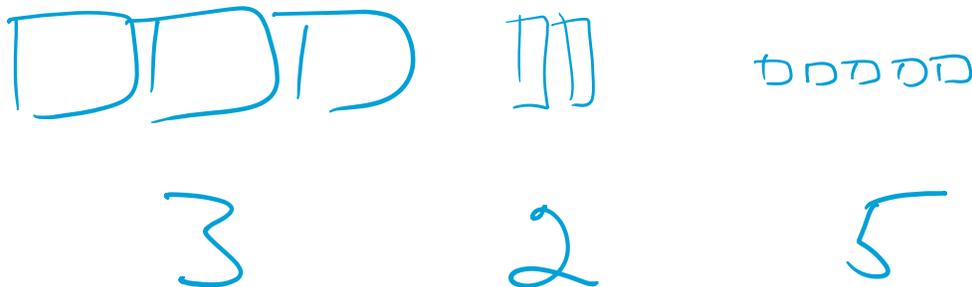


- c. Work out the problem using the paper-and-pencil partial-products method. Be prepared to share your work with the class.

$$\begin{array}{r}
 2.5 \\
 \times 1.3 \\
 \hline
 15 \\
 60 \\
 50 \\
 200 \\
 \hline
 3.25
 \end{array}$$

3×5
 3×20
 10×5
 10×20

d. Whole Class Discussion: How do the base-ten blocks relate to the paper-and-pencil method?



4. Given the problem 12.01(2.4)

a. Give an estimate of the result without any paper-and-pencil calculations.

about 24

b. Work out the problem using the paper-and-pencil partial-products method. Be prepared to share your estimate alongside your work with the class.

$$\begin{array}{r}
 12.01 \\
 \times 2.4 \\
 \hline
 4800 \\
 24000 \\
 \hline
 28800
 \end{array}$$

$4 \times 1 = 4$
 $4 \times 200 = 800$
 $4 \times 1000 = 4000$
 $20 \times 1 = 20$
 $20 \times 200 = 4000$
 $20 \times 1000 = 20000$