## Unit 5 Lesson 2: Using Diagrams to Represent Addition and Subtraction

### 1 Changing Values (Warm up)

#### Student Task Statement

1. Here is a rectangle.
* 
* What number does the rectangle represent if each small square represents:
	1. 1
	2. 0.1
	3. 0.01
	4. 0.001
1. Here is a square.
* 
* What number does the square represent if each small rectangle represents:
	1. 10
	2. 0.1
	3. 0.00001

### 2 Squares and Rectangles (Optional)

#### Images for Launch



#### Student Task Statement

You may be familiar with base-ten blocks that represent ones, tens, and hundreds. Here are some diagrams that we will use to represent base-ten units.

* A large square represents 1 one.
* A medium rectangle represents 1 tenth.
* A medium square represents 1 hundredth.
* A small rectangle represents 1 thousandth.
* A small square represents 1 ten-thousandth.



1. Here is the diagram that Priya drew to represent 0.13. Draw a different diagram that represents 0.13. Explain why both diagrams represent the same number.
* 
*
1. Here is the diagram that Han drew to represent 0.025. Draw a different diagram that represents 0.025. Explain why both diagrams represent the same number.
* 
*
1. For each number, draw or describe two different diagrams that represent it.
	1. 0.1
	2. 0.02
	3. 0.004
2. Use diagrams of base-ten units to represent each sum. Think about how you could use as few units as possible to represent each number.
	1. $0.03+0.05$
	2. $0.006+0.007$
	3. $0.4+0.7$

### 3 Finding Sums in Different Ways (Optional)

#### Images for Launch



#### Student Task Statement

1. Here are two ways to calculate the value of $0.26+0.07$. In the diagram, each rectangle represents 0.1 and each square represents 0.01.
* 
* Use what you know about base-ten units and addition to explain:
	1. Why ten squares can be “bundled” into a rectangle.
	2. How this “bundling” is represented in the vertical calculation.
1. Find the value of $0.38+0.69$ by drawing a diagram. Can you find the sum without bundling? Would it be useful to bundle some pieces? Explain your reasoning.
2. Calculate $0.38+0.69$. Check your calculation against your diagram in the previous question.
3. Find each sum. The larger square represents 1.
	1.
	* 
	1.
	* 
	*

### 4 Representing Subtraction (Optional)

#### Student Task Statement

1. Here are diagrams that represent differences. Removed pieces are marked with Xs. The larger rectangle represents 1 tenth. For each diagram, write a numerical subtraction expression and determine the value of the expression.
* 
1. Express each subtraction in words.
	1. $0.05−0.02$
	2. $0.024−0.003$
	3. $1.26−0.14$
2. Find each difference by drawing a diagram and by calculating with numbers. Make sure the answers from both methods match. If not, check your diagram and your numerical calculation.
	1. $0.05−0.02$
	2. $0.024−0.003$
	3. $1.26−0.14$



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