Name: Date:

**Student Exploration:** **Subtracting Whole Numbers
and Decimals**

**Vocabulary:** base-10 blocks, base-10 system, decimal, difference, regroup

**Prior Knowledge Questions** (Do these BEFORE using the Gizmo.)

Laurie is making French toast for a Girl Scout troop. She needs 46 slices of bread and 22 eggs.

1. Laurie has six full loaves of bread (10 slices each) and an opened loaf with 4 slices.
	1. How many slices of bread does she have? \_\_\_\_\_\_\_\_\_
	2. How many will she have when the French toast is done? \_\_\_\_\_\_\_\_\_\_
2. Laurie has two full cartons of eggs (12 eggs each) and an open carton with 7 eggs.
	1. How many eggs does Laurie have? \_\_\_\_\_\_\_\_\_\_
	2. How many will she have when the French toast is done? \_\_\_\_\_\_\_\_\_\_

**Gizmo Warm-up**

The *Subtracting Whole Numbers and Decimals* Gizmo uses **base-10 blocks** to model subtraction. Numbers can be modeled with *cubes* (single blocks), *rods* (rows of 10 cubes), and *flats* (squares of 100 cubes).

First you will model the subtraction problem 125 – 12.

1. Check that **Set block values** is set to **100, 10, 1**, and that **Model first number** is selected. Use the blocks to model 125.

How many flats, rods, and cubes did you use? Flats: \_\_\_\_\_ Rods: \_\_\_\_\_ Cubes: \_\_\_\_\_

1. Select **Model subtraction**. Drag blocks from the first number into the green **Subtraction bin** until you have modeled 12 in this bin.

How many of each did you drag down? Flats: \_\_\_\_\_ Rods: \_\_\_\_\_ Cubes: \_\_\_\_\_

1. Count the blocks remaining in the top (yellow) bin. What does 125 – 12 equal? \_\_\_\_\_\_\_\_\_\_

This is the **difference** between 125 and 12. To check, turn on **Show difference**.

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| **Activity A:** **Selling stamps** | Get the Gizmo ready: * Click **Clear**, and turn off **Show difference**.
* Be sure **Set block values** is set to **100, 10, 1**.
* Select **Model first number**.
 | 1030SE2 |

1. Mr. Brown at the post office sells stamps. Currently, he has 3 sheets of 100 stamps each, 2 packs of 10 stamps each, and 4 loose stamps. Model this amount in the Gizmo.
	1. How many flats, rods, and cubes did you use? Flats: \_\_\_ Rods: \_\_\_ Cubes: \_\_\_
	2. How many stamps does Mr. Brown have, total? \_\_\_\_\_\_\_\_\_\_
2. Margaret Skinner asks for 75 stamps. To model subtracting 75 stamps in the Gizmo, you will need to move blocks with a total value of 75 into the **Subtraction bin**.
	1. What could you do to have 5 “loose” cubes to drag into the **Subtraction bin**? (Hint: You can move rods into the **Ones** section, and flats into the **Tens** section.)

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* 1. Do that swap. How many do you have now? Flats: \_\_\_ Rods: \_\_\_ Cubes: \_\_\_
	2. What will you need to do before you can drag 7 rods into the **Subtraction bin**?

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* 1. Do that swap. How many do you have now? Flats: \_\_\_ Rods: \_\_\_ Cubes: \_\_\_
1. After **regrouping**, Mr. Brown is ready to give Margaret her stamps. To model this in the Gizmo, select **Model subtraction**. Then drag 75 blocks into the green **subtraction bin**.

How many stamps does Mr. Brown have left after this? \_\_\_\_\_\_\_\_\_\_\_

1. Turn on **Show difference**. What do the three blue numbers written over the 324 mean?

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1. Mouseover the 3 numbers in the subtraction. Which part of the model represents these?
	1. The 324 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. The 75 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. The difference between 324 and 75 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **Activity B:** **Counting pennies** | Get the Gizmo ready: * Click **Clear**, and turn off **Show difference**.
* Under **Set block values**, select **1, 0.1, 0.01**.
* Select **Model first number**.
 | 1030SE3 |

1. Marisa has 4 dollar bills (4 wholes), 6 dimes (6 tenths), and 2 pennies (2 hundredths). Model this in the Gizmo.
2. How many flats, rods, and cubes did you use? Flats: \_\_\_ Rods: \_\_\_ Cubes: \_\_\_
3. How much money does Marisa have? \_\_\_\_\_\_\_\_\_\_
4. Marisa wants to buy stamps for $2.84 total. She needs exact change for the stamp machine.
	1. To subtract $2.84, Marisa will need 4 pennies (cubes). She currently has 2. What exchange can you make so that you will have enough cubes to subtract?

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* 1. Do that swap. How many do you have now? Flats: \_\_\_ Rods: \_\_\_ Cubes: \_\_\_
	2. To subtract $2.84, Marisa will need 8 dimes (rods). What exchange do you need to make to make this possible?

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* 1. Do that swap. How many do you have now? Flats: \_\_\_ Rods: \_\_\_ Cubes: \_\_\_
1. Select **Model subtraction** and drag 2.84 to the **Subtraction bin**. How much

money does Marisa have left (in the yellow top bin) after buying the stamps? \_\_\_\_\_\_\_\_\_\_\_\_

1. Turn on **Show difference**. Explain the three blue numbers written above the 4.62.

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1. Click **Clear**, and turn off **Show difference**. Solve each problem at right by hand. Then use the Gizmo to model each problem and check answers.

(Note: For the last problem, set the block values to **0.1, 0.01, 0.001**.)

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| **Activity C:** **Ragged decimals** | Get the Gizmo ready: * Click **Clear**, and turn off **Show difference**.
* Under **Set block values**, select **1, 0.1, 0.01**.
* Select **Model first number**.
 | 1030SE4 |

1. Charlene has 5 dollars and 1 dime. Model this amount in the Gizmo.
2. How many flats, rods, and cubes did you use? Flats: \_\_\_ Rods: \_\_\_ Cubes: \_\_\_
3. How much money does Charlene have? \_\_\_\_\_\_\_\_\_\_
4. Charlene wants to buy a stamp, which costs 42 cents. Select **Model subtraction** and drag 4 dimes and 2 pennies (4 rods and 2 cubes) into the **Subtraction bin**.
5. What regrouping did you do before doing the subtracting? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. How much money does Charlene have left after subtracting? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Turn on **Show difference**. Notice that the original number, 5.10, has been changed.
3. Why is the 5 in 5.10 crossed out and replaced with a 4? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Why is there a small 1 written next to the 0 in 5.10? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. What do you notice about the decimal points of the three numbers? \_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Click **Clear**, and turn off **Show difference**. Set block values to **0.1, 0.01, 0.001**. To the right, find 0.8 – 0.019 by hand. Check your answer in the Gizmo.
	1. What does 0.8 – 0.019 equal? \_\_\_\_\_\_\_\_\_\_
	2. When you subtract decimals, it can be a challenge to line them up correctly. What is a good rule for lining up decimals during subtraction?

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