



Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Student Exploration: Subtracting Whole Numbers and Decimals

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

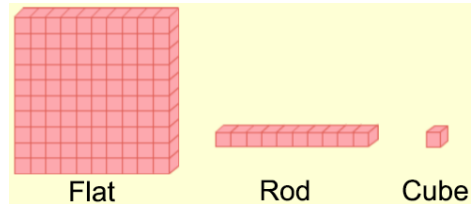
**Prior Knowledge Questions** (Do these BEFORE using the Gizmo.)

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

- Laurie has six full loaves of bread (10 slices each) and an opened loaf with 4 slices.
  - How many slices of bread does she have? \_\_\_\_\_
  - How many will she have when the French toast is done? \_\_\_\_\_
- Laurie has two full cartons of eggs (12 eggs each) and an open carton with 7 eggs.
  - How many eggs does Laurie have? \_\_\_\_\_
  - 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  $125 - 12$ .

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

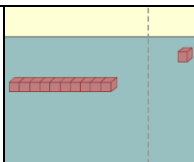
How many flats, rods, and cubes did you use? Flats: \_\_\_\_\_ Rods: \_\_\_\_\_ Cubes: \_\_\_\_\_

- 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: \_\_\_\_\_

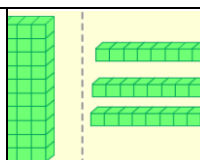
- Count the blocks remaining in the top (yellow) bin. What does  $125 - 12$  equal? \_\_\_\_\_ This is the **difference** between 125 and 12. To check, turn on **Show difference**.



<b>Activity A:</b> <b>Selling stamps</b>	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> <li>• Click <b>Clear</b>, and turn off <b>Show difference</b>.</li> <li>• Be sure <b>Set block values</b> is set to <b>100, 10, 1</b>.</li> <li>• Select <b>Model first number</b>.</li> </ul>	
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- 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.
  - How many flats, rods, and cubes did you use? Flats: \_\_\_\_ Rods: \_\_\_\_ Cubes: \_\_\_\_
  - How many stamps does Mr. Brown have, total? \_\_\_\_\_
- 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**.
  - 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.)  
 \_\_\_\_\_
  - Do that swap. How many do you have now? Flats: \_\_\_\_ Rods: \_\_\_\_ Cubes: \_\_\_\_
  - What will you need to do before you can drag 7 rods into the **Subtraction bin**?  
 \_\_\_\_\_
  - Do that swap. How many do you have now? Flats: \_\_\_\_ Rods: \_\_\_\_ Cubes: \_\_\_\_
- 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? \_\_\_\_\_
- Turn on **Show difference**. What do the three blue numbers written over the 324 mean?
   
\_\_\_\_\_
   
\_\_\_\_\_
- Mouseover the 3 numbers in the subtraction. Which part of the model represents these?
  - The 324 is \_\_\_\_\_
  - The 75 is \_\_\_\_\_
  - The difference between 324 and 75 is \_\_\_\_\_



<b>Activity B:</b> <b>Counting pennies</b>	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> <li>• Click <b>Clear</b>, and turn off <b>Show difference</b>.</li> <li>• Under <b>Set block values</b>, select <b>1, 0.1, 0.01</b>.</li> <li>• Select <b>Model first number</b>.</li> </ul>	
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1. Marisa has 4 dollar bills (4 wholes), 6 dimes (6 tenths), and 2 pennies (2 hundredths). Model this in the Gizmo.

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

B. How much money does Marisa have? \_\_\_\_\_

2. Marisa wants to buy stamps for \$2.84 total. She needs exact change for the stamp machine.

A. 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?

\_\_\_\_\_

B. Do that swap. How many do you have now? Flats: \_\_\_\_ Rods: \_\_\_\_ Cubes: \_\_\_\_

C. To subtract \$2.84, Marisa will need 8 dimes (rods). What exchange do you need to make to make this possible?

\_\_\_\_\_

D. Do that swap. How many do you have now? Flats: \_\_\_\_ Rods: \_\_\_\_ Cubes: \_\_\_\_

3. 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? \_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5. 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.

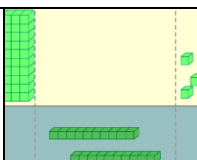
$$\begin{array}{r} 1.57 \\ - 1.39 \\ \hline \end{array}$$

$$\begin{array}{r} 6.13 \\ - 4.78 \\ \hline \end{array}$$

$$\begin{array}{r} 0.807 \\ - 0.084 \\ \hline \end{array}$$

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



<b>Activity C:</b> <b>Ragged decimals</b>	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> <li>• Click <b>Clear</b>, and turn off <b>Show difference</b>.</li> <li>• Under <b>Set block values</b>, select <b>1, 0.1, 0.01</b>.</li> <li>• Select <b>Model first number</b>.</li> </ul>	
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- Charlene has 5 dollars and 1 dime. Model this amount in the Gizmo.
  - How many flats, rods, and cubes did you use? Flats: \_\_\_\_ Rods: \_\_\_\_ Cubes: \_\_\_\_
  - How much money does Charlene have? \_\_\_\_\_
  
- 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**.
  - What regrouping did you do before doing the subtracting? \_\_\_\_\_  
 \_\_\_\_\_
  - How much money does Charlene have left after subtracting? \_\_\_\_\_
  
- Turn on **Show difference**. Notice that the original number, 5.10, has been changed.
  - Why is the 5 in 5.10 crossed out and replaced with a 4? \_\_\_\_\_  
 \_\_\_\_\_
  - Why is there a small 1 written next to the 0 in 5.10? \_\_\_\_\_  
 \_\_\_\_\_
  - What do you notice about the decimal points of the three numbers? \_\_\_\_\_  
 \_\_\_\_\_
  
- 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.
 


  - What does  $0.8 - 0.019$  equal? \_\_\_\_\_
  - 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?  
 \_\_\_\_\_  
 \_\_\_\_\_

