



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

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

## Student Exploration: Sums and Differences with Decimals

**Vocabulary:** addend, decimal, decimal point, difference, hundredth, sum, tenth

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

Suppose there are 175 tickets available for a school play.

1. If 98 tickets for the play have been sold, how many are left? \_\_\_\_\_

2. After 24 more tickets are sold, how many have been sold, total? \_\_\_\_\_

### Gizmo Warm-up

In the *Sum and Differences with Decimals* Gizmo, you can add or subtract two numbers using area models or a number line. The two grids on top can model up to two wholes each. The model in the middle shows the sum or difference, up to four wholes.

Numbers are modeled by shading parts of a grid. There are two ways to do this. To enter a number, click in and highlight the text field showing the current number, type your new number, and hit **Enter**. To shade the grid directly, just click inside it.

1. Set the red model to **Integers** and blue to **Hundredths**. Select **Show number line**.

A. Show 2 on the red model. How many parts did you shade? \_\_\_\_\_

B. Show 0.93 on the blue model. How many parts did you shade? \_\_\_\_\_

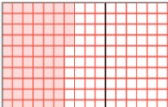
2. To combine or show the **sum** of two numbers, called **addends**, select **+**.

What is  $2 + 0.93$ ? \_\_\_\_\_

3. To take away or show the **difference** of two numbers, select **-**.

What is  $2 - 0.93$ ? \_\_\_\_\_



<b>Activity A:</b> <b>Combining and taking away</b>	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> <li>• Click <b>Reset</b>.</li> <li>• Set the red and blue models to <b>Hundredths</b>.</li> </ul>	<div style="border: 1px solid black; padding: 2px;"> <span style="border: 1px solid black; padding: 1px;">0.64</span> <span style="border: 1px solid black; padding: 1px;">Hundredths</span>  </div>
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A **decimal** is a number written in a base-10 system. It usually has a **decimal point** separating the ones place from **tenths**, **hundredths**, etc. The tenths place is the position of the first digit after the decimal point. The hundredths place is the second digit after the decimal point.

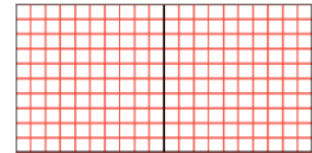
1. Type the decimal 0.06 in the text field of the red model and then hit **Enter**.

A. Shade the grid to the right to show 0.06.

B. How many parts are shown in each whole? \_\_\_\_\_

C. How many parts are shaded to model 0.06? \_\_\_\_\_

D. How would you say or write 0.06 in words? \_\_\_\_\_

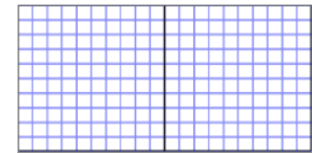


2. Show 0.04 on the blue model.

A. Shade the grid to the right to show 0.04.

B. How many parts are shaded to model 0.04? \_\_\_\_\_

C. How would you say or write 0.04 in words? \_\_\_\_\_



3. With 0.06 and 0.04 modeled in the Gizmo, select **+** to model the sum  $0.06 + 0.04$ . Shade the grid to the right to represent the sum.

A. How many parts are shaded in the sum? \_\_\_\_\_

B. This sum is 10 hundredths. How many tenths does this look like? \_\_\_\_\_

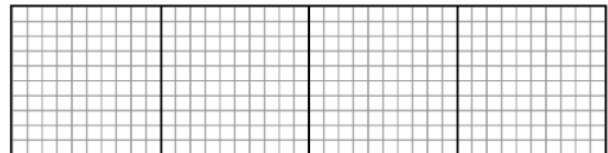
C. Write sentences for the sum of 0.06 and 0.04 using numbers and then using words.

Numbers: \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_

Words: \_\_\_\_\_ hundredths + \_\_\_\_\_ hundredths = \_\_\_\_\_ hundredths

\_\_\_\_\_ hundredths + \_\_\_\_\_ hundredths = \_\_\_\_\_ tenth(s)

D. How many hundredths are in one tenth? \_\_\_\_\_



**(Activity A continued on next page)**



### Activity A (continued from previous page)

4. Now select **-** to find the difference of 0.06 and 0.04.

A. Write a sentence for the difference using numbers. \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_

B. Write a sentence for the difference using words.

\_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_

5. Click **Reset**. Change the red model to **Integers** and the blue model to **Tenths**. Show 1 in the red model and 0.8 in blue. Select **-**.

A. How many tenths are in 1 whole? \_\_\_\_\_

B. Write sentences for the difference of 1 and 0.8 using numbers and then using words.

Numbers: \_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_

Words: \_\_\_\_\_ whole - \_\_\_\_\_ tenths = \_\_\_\_\_ tenths

\_\_\_\_\_ tenths - \_\_\_\_\_ tenths = \_\_\_\_\_ tenths

6. Click **Reset**. Change red to **Hundredths**. Show 1.23 on the red model and 0.9 on blue.

A. How many hundredths are in 0.9? \_\_\_\_\_ tenths = \_\_\_\_\_ hundredths

B. Select **+**. What is the sum of 1.23 and 0.9? \_\_\_\_\_

C. Select **-**. What is the difference of 1.23 and 0.9? \_\_\_\_\_

7. Find each sum or difference. Then check your answers in the Gizmo. (Note: The last two cannot be modeled in the Gizmo.)

A.  $2 + 0.9 =$  \_\_\_\_\_       $2 - 0.9 =$  \_\_\_\_\_

B.  $1.32 + 1 =$  \_\_\_\_\_       $1.32 - 1 =$  \_\_\_\_\_

C.  $0.7 + 0.49 =$  \_\_\_\_\_       $0.7 - 0.49 =$  \_\_\_\_\_

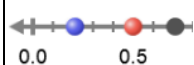
D.  $1.04 + 0.77 =$  \_\_\_\_\_       $1.04 - 0.77 =$  \_\_\_\_\_

E.  $1.68 + 0.86 =$  \_\_\_\_\_       $1.68 - 0.86 =$  \_\_\_\_\_

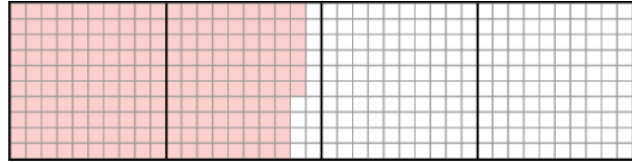
F.  $9.5 + 5.9 =$  \_\_\_\_\_       $9.5 - 5.9 =$  \_\_\_\_\_

G.  $4.7 + 2.65 =$  \_\_\_\_\_       $4.7 - 2.65 =$  \_\_\_\_\_



<b>Activity B:</b> <b>Finding missing numbers</b>	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> <li>• Click <b>Reset</b>.</li> <li>• Set the red and blue models to <b>Hundredths</b>.</li> <li>• Click <b>Show number line</b>.</li> </ul>	Show number line 
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1. Two numbers have a sum of 2. One of the addends is 1.86. Show 1.86 on the red model. The model in the middle (the sum) should now look like this:



- A. Use a pencil to shade the model above to show 2 wholes.

What number did you shade with your pencil? \_\_\_\_\_

- B. Select **+**. Drag the blue circle on the number line until the black dot (the sum) is on 2. Look at the blue model on the top. How does the number shown on the blue model compare with the number you shaded in part A?

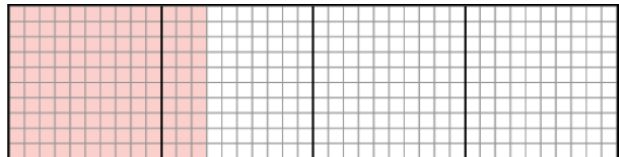
\_\_\_\_\_

- C. What is the missing number in the equation  $1.86 + \underline{\hspace{2cm}} = 2$ ? \_\_\_\_\_

- D. How can you use 1.86 and 2 to find the missing number? \_\_\_\_\_

\_\_\_\_\_

2. Some number subtracted from 1.3 results in a difference of 0.85. Click **Reset**. Show 1.3 on the red model. The model (the difference) in the middle should now look like this:



- A. Use a pencil to shade over the red part in the model above until only 85 red squares are left. What number did you shade with your pencil? \_\_\_\_\_

- B. Select **-**. Drag the blue circle on the number line until the black dot (the difference) is on 0.85. Look at the blue model on the top. How does the number shown in the blue model compare with the number you shaded in part A?

\_\_\_\_\_

- C. What is the missing number in the equation  $1.3 - \underline{\hspace{2cm}} = 0.85$ ? \_\_\_\_\_

- D. How can you use 1.3 and 0.85 to find the missing number? \_\_\_\_\_

\_\_\_\_\_

**(Activity B continued on next page)**

### Activity B (continued from previous page)

3. Suppose two positive numbers have a sum of 3.68.

A. Do both numbers have to be less than 3.68? \_\_\_\_\_ Explain. \_\_\_\_\_

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B. Click **Reset**. Select **+**. Drag the blue and red circles on the number line until you find a pair of numbers whose sum is 3.68. Record your numbers in the blanks below.

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = 3.68$$

C. There are many other pairs of positive numbers whose sum is 3.68. Use the Gizmo to find two additional pairs.

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = 3.68 \qquad \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = 3.68$$

4. Suppose two positive numbers have a difference of 1.61.

A. Do both numbers have to be less than 1.61? \_\_\_\_\_ Explain. \_\_\_\_\_

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B. Click **Reset**. Select **-**. Drag the blue and red circles on the number line until you find two numbers whose difference is 1.61. Record your numbers in the blanks below.

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = 1.61$$

C. There are many other pairs of positive numbers whose difference is 1.61. Use the Gizmo to find two additional pairs.

$$\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = 1.61 \qquad \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = 1.61$$

5. Fill in the blanks below. Then check your answers in the Gizmo. (Note: The last one cannot be modeled in the Gizmo.)

A.  $1 + \underline{\hspace{2cm}} = 1.56$                        $1 + \underline{\hspace{2cm}} = 2.8$

B.  $2 - \underline{\hspace{2cm}} = 1.3$                        $2 - \underline{\hspace{2cm}} = 0.96$

C.  $1.34 + \underline{\hspace{2cm}} = 1.85$                        $1.34 + \underline{\hspace{2cm}} = 2.7$

D.  $0.87 - \underline{\hspace{2cm}} = 0.66$                        $0.87 - \underline{\hspace{2cm}} = 0.09$

E.  $\underline{\hspace{2cm}} + \underline{\hspace{2cm}} = 0.16$                        $\underline{\hspace{2cm}} - \underline{\hspace{2cm}} = 0.16$

F.  $3.34 + \underline{\hspace{2cm}} = 5.89$                        $3.34 - \underline{\hspace{2cm}} = 1.12$

