**5.NBT.7** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Mathematical Background**:**

An important part of students’ mathematical work in the elementary grades is building an understanding of the base-ten number system. The following activities will support development of knowledge about landmark numbers in that system. Working with 10, 100 and multiples of these numbers will help students build fluent and efficient strategies for addition and subtraction of whole numbers and decimals.

Activity #1

* Show students the number 435 and have them say it.
* Now write + 50 next to it. Have students write and show the sum. Ask the class to identify the place value of the digits.
* Ask
  + Which digits changed? What places are they in? Why?
  + Which digits stayed the same? What places are these digits in? Why?
  + Is the new number bigger than the original number? Smaller? About the same?
  + *The purpose of questions comparing the sum with the original number is to help students visualize how numbers are related to one another in the base-ten number system. Ask students to compare to effect of adding 10’s and 100’s to a number.*
* Continue the same procedure for the following numbers (435 + 100, +500, -100, -200)

Activity #2

* Review the meaning of multiple with students. Explain that they are going to practice adding and subtracting multiples of 10 and 100. Ask students to explain what is meant by multiple of 10 and multiple of 100.
* Present students with the following problems and ask them to solve them

893 – 100 =

893 – 200 =

893 – 300 =

* Ask students
  + Why are these problems easy to solve? What number is changing? Why is that?

Tables A and B provide additional number sets to continue practicing with multiples of 10 and 100 and to extend this practice to work with decimals.

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Mathematical Background**:**

Students should know that the order of addends can be rearranged without affecting the sum (commutative property) and that addition and subtraction have an inverse relationship. The following activities will provide students with opportunities to build on flexible strategies based on properties.

Activity #3

* Write 834 + 100 – 30 =
* Ask students how they would solve this problem.
  + What do you have to pay attention to?
  + What would you do first?
  + Encourage students to begin with 100 or 30
  + Ask students to explain why you can begin with 100 or 30

Activity # 4

Materials: Index cards with the following numbers (+10, -10, +20, -20, +30, -30, +40, -40, +50, -50, +100, -100, +200, -200, +300, -300, +400, -400, +500, -500) and score sheet.

* Introduce the “Changing Place Value” game.
  + Model choosing a three-digit for a starting number and write this on a score sheet.
  + Model drawing five Change Cards and place them so all students can see them.
  + Invite students to talk to a neighbor and decide which cards to use. Give students a few minutes to solve this.
  + Have students share their solutions.
  + Record the solutions on the score sheet.
* Continue playing this game as class. Students will benefit from seeing and discussing the different strategies students used to solve the problem.

Activity #5

* Students play game (Players 2- 4)
  + Choose a three-digit number and write it in the Starting Number column on your score sheet.
  + Draw five change cards and lay them face up.
  + Choose any or all five of the change cards. Record these cards in the Change Cards Used column of your score sheet.
  + Use these cards with your starting number to make a new number. Record the equation that shows how you made your new number.
  + On your next round, draw five new Change Cards. Your starting number will be the number you made in the last round. (Variation: Students may keep the same starting number)

Students should be given addition and subtraction word problems to solve along with the above activities. Different solutions should be shared and discussed. The goal is to end up with charts that describe each strategy mathematically. Help students identify the differences and similarities among the strategies. Help students articulate what is happening mathematically in each strategy by restating what they did.

Ask:

* What was the first thing you did when you started to solve the problem?
* Did anyone start the same way? Did anyone start in a different way?
* Did you change anything about the numbers? Did you break them into parts?
* I see that you started by adding the hundreds first? What will you do next?
* You changed the numbers to make it easier to add. What will you do with the extra \_\_\_ that you added to the problem?
* What made you decide to choose that strategy?

Activity #6

* Write the following problem on the board:
  + 296 + 468 =
* Explain that they will solve the following problems first before solving the problem above.
  + 296 + 400 =
  + 200 + 400 =
  + 300 + 468 =
* Ask for solutions to the problems. Then ask if anyone used the first problem to solve 296 + 468? What did you do first? What did you have to do next?
* Repeat the activity with 200 + 400 and 300 + 468.
* Additional problems:
  + 315 + 566 = 288 + 456 = 597 + 300 =
  + 300 + 500 = 288 + 400 = 597 + 300 =
  + 315 + 500 = 200 + 400 = 600 + 375 =
  + 315 + 5 = 300 + 450 = 600 + 372 =
  + 785 + 428 = 532 + 371 + 212 =
  + 785 + 400 = 500 + 300 + 200 =
  + 800 + 428 = 532 + 300 + 200 =
  + 785 + 15 = 530 + 370 =