Scaffolding Task: Expanding Decimals with Money

STANDARDS FOR MATHEMATICAL CONTENT

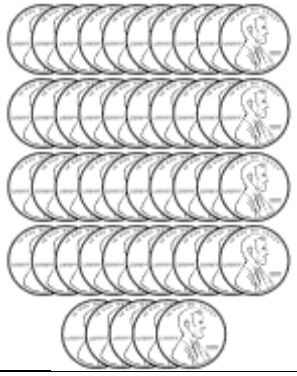
MCC4.NF.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of the comparisons with the symbols >, +, or <, and justify the conclusions, e.g. by using a visual model.

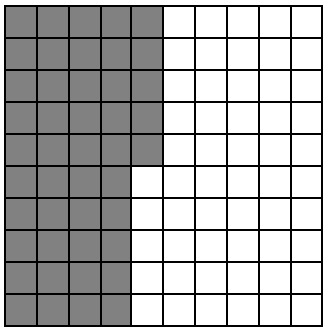
STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make sure of structure.
8. Look for and express regularity in repeated reasoning.

BACKGROUND KNOWLEDGE

Using our money system, where the dime represents tenths and the penny represents hundredths, students may more easily see decimals as parts of a whole, with the whole being one dollar. Decimal fractions such as 45/100 can be easily modeled using dimes and pennies as 4 dimes and 5 pennies. This allows the students to easily see 45/100 as 40/10 + 5/100 as well as 4/10 + 5/100.

4 Dimes and 5 Pennies	40 Pennies and 5 Pennies
	



ESSENTIAL QUESTIONS

- When can tenths and hundredths be used interchangeably?

- When you compare two decimals, how can you determine which one has the greater value?

MATERIALS

- 10 dimes and 10 pennies for each pair
- "Expanding Decimals with Money" Recording Sheet

GROUPING

Individual or partner grouping

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Comments

As students develop their decimal understanding, we need to continually emphasize the link between fraction concepts and our base-ten place value system. Revisiting the link between decimal fractions and decimals often and working with familiar contexts for decimal fractions will help build that bridge. Additionally, continuing to help students see decimals as a continuation of our base-ten whole number system will help them apply the rules of whole numbers within fraction situations. This lesson helps students see decimals and decimal fractions in expanded form, much like they have done expanded form using whole numbers. This ability to expand tenths and hundredths will help in later tasks as students add tenths and hundredths.

Students need to develop the ability to think flexibly about decimals in a variety of contexts. One of the contexts of decimals they are most familiar with is that of our money system.

Task:

Review with students that pennies represent hundredths of a dollar and dimes represent tenths of a dollar. Have students compare this model of decimals with base-ten models they have used previously.

- Which pieces of the base ten model match with the dimes? With the pennies? With the dollar?

Review expanded form notations using whole numbers. Model who to write a decimal fraction in expanded form based on students' previous knowledge.

$$45/100 = 40/100 + 5/100 = 4/10 + 5/100$$

Student Directions:

Pull a handful of coins from your bag of dimes and pennies. Fill in the table below with the decimal represented by your coins. Write your decimals in expanded notation using both the dime and penny combination and how you would represent it if you only used pennies. See the example in the table.

Decimal	Decimal Made with Pennies (with Expanded Notation)	Decimal Made with Pennies and Dimes (with Expanded Notation)
0.36	30 pennies + 6 pennies 30/100 + 6/100	3 dimes + 6 pennies 3/10 +6/100

FORMATIVE ASSESSMENT QUESTIONS

- How do the dimes represent decimal fractions? The pennies?
- How does a money model help you represent tenths and hundredths?
- What strategies did you use to add tenths and hundredths?
- Where students able to move easily from tenths to hundredths?
- Did students see the connection between the money models and the base ten model previously used?
- How did I assess for student understanding?
- Did students see the pattern that occurs with decimal fractions?

DIFFERENTIATION

Extension

- Provide students all types of coins and/or bills in the bag of money and have them complete the same activity having to change all coins into "decimal fraction" friendly coins and justify the exchanges.

Intervention

- Have students create the money amount using base ten models and place the coins on top of the base-ten blocks they match with in order to write the decimals. Have students write the value of each place (tenths and hundredths) directly under the model on place value mats.

Name _____ Date _____

Expanding Decimals with Money

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