SCAFFOLDING TASK; Making "Cents" of Decimals

Adapted from Santa Rosa District Schools, Florida

STANDARDS FOR MATHEMATICAL CONTENT

MCC5.NBT.3 Read, write, and compare decimals to thousandths.

- **a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000).**
- **b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.**

MCC5.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.

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 use of structure.**
8. **Look for and express regularity in repeated reasoning.**

BACKGROUND KNOWLEDGE

Students should have experience representing addition and subtraction of whole numbers with models.

Students should have a concept of money notation (dollar and cents symbols)

Also, students should have an understanding of how to represent addition with decimal numbers.

Common Misconceptions

Students might compute the sum or difference of decimals by lining up the right-hand digits as they would whole number. For example, in computing the sum of 15.34 + 12.9, students will write the problem in this manner:

15.34
+12.9
16.63

To help students add and subtract decimals correctly, have them first estimate the sum or difference. Providing students with a decimal-place value chart will enable them to place the digits in the proper place.

ESSENTIAL QUESTIONS

- How can I determine if I have represented the groups of pennies accurately?
- Can I have more than two groups and still be accurate?
- How is money represented in decimal numbers?

MATERIALS

- 100 pennies per group
- Paper and pencils
- Crayons or colored pencils
- Paper towels or mats for pennies
- Cups in which to shake pennies
- Recording sheet

GROUPING

Partner /Small Group Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students learn decimals using groups of 100 pennies. By classifying the pennies in different ways there are an unlimited number of ways to represent decimal numbers in money notation.

Comments

To introduce this task, review money notation (decimals, cents signs, and dollar signs). Review place value of decimal numbers using money notation. Model your thinking with ways to classify the pennies.

Task Directions:

Demonstrate ways to classify 100 pennies. Heads & tails would be a great example with which to begin. Dump out 100 pennies and spread them out under a document camera or overhead projector. Count how many coins are heads and how many are tails. Using correct money notation, record each amount. Have students add the two amounts to see if they total one dollar. Be sure to clarify that 100 cents = one dollar and that each penny represents 1/100 of a dollar.

Divide students into groups and give each group a cup of 100 pennies. Have them dump the pennies and record the number of heads and tails using money notation. Ask each group to find another way to classify the pennies. (Dates, Place minted, etc.) Have them record their answers on the sheet provided.

FORMATIVE ASSESSMENT QUESTIONS

- Why will your answer be different each time you dump the pennies?
- How can you check to see if you counted correctly?
- Are there more ways to classify the pennies?

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DIFFERENTIATION

Extension

- Have students make bar graphs of the pennies, showing how they were classified.
- Let students work with dimes and explain the difference.

Intervention

- Students may need a model for money notation.
- Students may use calculators.

Making Cents of Decimals

Heads	Tails	Total
Example: $0.47	$0.53	$1.00

Other Ways to Classify Pennies
