Constructing Task: Taxi Trouble

STANDARDS FOR MATHEMATICAL CONTENT

MCC4.NF.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100*[1].

MCC4.NF.6 Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*

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

Students may need some background knowledge built on how taxi companies charge for their services. Many of them have a flat fee plus an additional rate per mile or fraction of a mile traveled. Often the flat fee is a distractor from the per mile rate. It is important that students make predictions from their initial reading of the rate and then compare that with the actual result. This will show them how important it is to do the math when making choices on how to spend their money!

ESSENTIAL QUESTIONS

- How can decimal fractions help me determine the best choices on how to spend my money?

MATERIALS

- Paper
- Pencils

- "Taxi Trouble" Student Sheet

GROUPING

Individual or partner

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Task:

- Introduce the problem. Make sure students understand they are to defend their choice and use mathematics (shown in number and word form) to defend their choices.
- Have students briefly read the task and make predictions about which Taxi Company they think will be the best deal. Have them explain their thinking for their predictions.

Students will follow the directions below from the "Taxi Trouble" recording sheet.

Sam is downtown Atlanta and needs to take a taxi 5 miles to the convention center. There is a sign posted with the different taxi companies and their rate.

Taxi Company A: $4.00 sitting fee and 30/100 of a dollar for every 1/10 of a mile.

Taxi Company B: Free sitting fee and 5/10 of a dollar for every 1/10 of a mile.

Taxi Company C: $10.00 sitting fee and 2/10 of a dollar for every 1/10. (Sam has a 1/10 off of your total price coupon)

Which Taxi cab company should Sam choose to ride to the convention center?

FORMATIVE ASSESSMENT QUESTIONS

Have each pair or group share their work. Focus their discussion on:

- How are you determining the cost of the ride for each Taxi Company?
- How are you organizing your work?
- Where have you used decimal fractions and decimal to defend your thinking?
- Which company they thought was best
- The mathematical justification for their thinking
    - The methods they used for determining the cost of each company
    - How they combined the tenths and hundredths
- After and while groups are sharing, have them look for groups that had efficient strategies, the similarities between the methods used, and the differences between the methods used.
- Which strategies for combining tenths and hundredths did you see today that worked best?
- Where you surprised by the results?
- What did you learn about the decimal representations of the money being spent?
- Were students able to find the correct price for each company using decimals and decimal fractions?

- How did students show connections between tenths and hundredths?

DIFFERENTIATION

Extension

- Have students create their own taxi company and write its sitting fee and charge per mile in terms of tenths of a mile. Have them compare their company's price with the company's listed.

Intervention

- Have students use grids, money manipulatives, and/or other concrete models to build each amount of money for the ride. Use this concrete model as the basis for the number representations they use to explain their thinking.

Name _____ Date _____

Taxi Trouble

Sam is in downtown Atlanta and needs to take a taxi 5 miles to the convention center. There is a sign posted with the different taxi companies and their rate.

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Taxi Company C: $10.00 sitting fee and 2/10 of a dollar for every 1/10. (Sam has a 1/10 off of your total price coupon)

Which Taxi cab company should Sam choose to ride to the convention center? Use math words, numbers, models, and symbols to explain and justify your choice.