Constructing Task: Estimation as a Check

STANDARDS FOR MATHEMATICAL CONTENT

MCC4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
MCC4.NBT.3 Use place value understanding to round multi-digit whole numbers to any place.
MCC4.NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.

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

In order for students to be able to round accurately, "rounding should be flexible and well understood conceptually" (Van de Walle, 246). In order for students to conceptually understand rounding, they must be engaged in contexts to allow them to make sense of this concept. This task provides several contexts in which students will have to determine the best estimation for the situation. With these estimations, students will use the most familiar form of estimation, rounding (Van de Walle, 241).

When students use the standard written forms or use a calculator, it is essential that they demonstrate good number sense in rejecting answers that are obviously wrong.

ESSENTIAL QUESTIONS

- What is a sensible answer to a real problem?
- What information is needed in order to round whole number to any place?
- How can I ensure my answer is reasonable?
- What effect does a remainder have on my rounded answer?

MATERIALS

- Estimation as a Check recording sheet
- Empty number lines

GROUPING

Partner or small group

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

Comments: Before students attempt this task, they should have had opportunities to work with various contexts which required rounding to determine a reasonable answer. Students should be comfortable using place value concepts within their explanation of a rounded answer. Through context problems, students should have concluded a reasonable rounded answer is based on the context of the situation and not rules or procedures for rounding.

Task directions:

Students will follow the directions below from the "Estimation as a Check" recording sheet.

Problem: To work out 4,567 + 4,890, Maureen uses her calculator or pencil and paper. Her answer is 8,457. Is Maureen's answer correct? Show how you know.

FORMATIVE ASSESSMENT QUESTIONS

- What is the problem asking you?
- Does your answer make sense? How do you know?
- How does rounding help you in this context?
- Did you get the same answer for 44÷7 each time you encounter it? Why or why not?

DIFFERENTIATION

Extension

- Discuss whether these answers are definitely wrong or not: 2,365 + 7,694 = 10,059; 1,788 – 891= 497

Intervention

- Adjust the numbers in Maureen's problem to include three-digit numbers.
- Provide students with a number line with a range of numbers noted.

Name _____ Date_____

Estimation as a Check

Directions

Problem: To work out 4,567 + 4,890, Maureen uses her calculator or pencil and paper.
Her answer is 8,457. Is Maureen's answer correct? Show how you know your answer is correct.