Constructing Task: Too Heavy? Too Light?

STANDARDS FOR MATHEMATICAL CONTENT

MCC4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36)*

MCC4.MD.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

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 need to know which units are within the same system of measurement and how they are related. They will also need to have multi-digit addition and subtraction skills.

ESSENTIAL QUESTIONS

- When do we use conversion of units?
- Why are units important in measurement?
- What happens to a measurement when we change units?

MATERIALS

"Too Heavy? Too Light?" student recording sheet

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

In this task, students will add weights of different units but within the same system. Conversion of units will need to be used.

Comments

In this task, students are asked to combine several weights to find the total weight. Since all weights are given using two different units (kg and g, or lb and oz), students must think about how the units are related to each other. For example, students will need to use the following relationships: 1 kg = 1,000 g and 1 lb = 16 oz.

Students may use different strategies to answer the questions on the "Too Heavy? Too Light?" student recording sheet. Some may choose to convert everything to the smaller unit (g or oz) before adding the given weights. Others will try to add the two units separately and then convert, if necessary. It is important to provide the time required for students to share and discuss their different strategies.

Task Directions

Students will follow the directions below from the "Too Heavy? Too Light?" student recording sheet.

Answer each of the following problems. Share and discuss how you solved the problems.

Problem 1

Marvin has 3 cousins in Michigan whose birthdays are all in February. He wants to send birthday presents to all three of them. Because the delivery company cannot send a box heavier than 10 kg, he had to weigh the three presents he bought. Their weights were 4 kg 700 g, 2 kg 800 g, and 3 kg 200 g. Can he put all three presents in one box? Why or why not?

Problem 2

Kim is participating in a bass fishing tournament. In order to advance to the final round, the total weight of the fish she catches must be more than 5 pounds. Kim caught 4 fish that weighed as follow: 1 lb 6 oz, 13 oz, 1 lb 7 oz, and 1 lb 4 oz. Can Kim go on to the final round?

Problem 3

Stevie's Bakery received 15 kg 700 g of sugar. The production manager noticed that they needed 23 kg 100 g of sugar to make the order of cookies she just received. How much more sugar does she need to complete this order of cookies?

FORMATIVE ASSESSMENT QUESTIONS

- What steps did you take to solve the problem?

- Did you convert to smaller units first? Why or why not?
- How could you solve the problem in a different way?
- Why is it important to understand measurement in real life?

DIFFERENTIATION

Extension

- Have students solve the problem in at least two different ways and write about the different strategies, describing the differences. Then have students tell why one is better than the other.
- Ask students to create their own problems using a common situation they may encounter.

Intervention

- Provide the following steps to help solve these problems. Step 1, have students use a drawing with labels to set up the problem. Step 2, have students convert. Step 3, have students solve.
- Before giving students who struggle this task, provide similar problems that been amended. An example is shown below. By eliminating information that is not important for the problem, students are able to focus on the mathematics.

Name _____ Date _____

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