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Session 411

Taking Action in Middle School: Implementing Effective Mathematics Teaching Practices

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Handout Packet

Activity 1

Analyzing Teaching and Learning 3.1

Comparing Two Tasks Involving Proportional Relationships

1. Solve the Candy Jar task and the Finding the Missing Value task. Consider the strategy that you use to solve each task and the features of the problem that led you to use it.
2. Consider the ways in which the two tasks are the same and the ways in which they are different. Which one is more likely to promote reasoning and problem solving? Why?

The Candy Jar Task	The Finding the Missing Value Task
A candy jar contains 5 Jolly Ranchers and 13 jawbreakers. Suppose that you had a new candy jar with the same ratio of Jolly Ranchers to jawbreakers, but it contains 100 Jolly Ranchers. How many jawbreakers would you have? Explain how you know. Adapted from Smith et al. 2005	Find the value of the unknown in each of the proportions shown below. $\frac{5}{2}=\frac{y}{10}$ $\frac{a}{24}=\frac{7}{8}$ $\frac{n}{8}=\frac{3}{12}$ $\frac{30}{6}=\frac{b}{7}$ $\frac{5}{20}=\frac{3}{d}$ $\frac{3}{x}=\frac{4}{28}$

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Activity 2

Analyzing Teaching and Learning 6.1

Considering the Advantages of Different Representations

1. Solve the Cars and Motorcycles task shown below. Think about the representation that you used and how it helped you make sense of the situation.
2. Review the samples of student work shown in figure 6.2. Consider the following:
   - What does each representation tell you about what the student understands about the situation?
   - How do the different representations connect with one another?

The Cars and Motorcycles Task

Diane looked out the window of her math classroom at the teachers' parking lot and said, "There are 13 motorcycles and cars in the lot." Steve looked out the window and said, "I see 42 wheels." The teacher asked, "How many motorcycles and how many cars are in the parking lot?"

Show all your work, and explain your thinking.

This task was adapted from the QUASAR Cognitive Assessment Instrument (Lane 1993).

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Activity 3

Analyzing Teaching and Learning 7.1 more4U

Analyzing Whole-Class Classroom Discourse

Watch the video clip of the discussion of the Counting Cubes task in Peter Dubno's classroom. While you watch the video, pay attention to the student discourse and the connections that students make between representations. Specifically—

1. What does the discourse reveal about students' understandings of the connections between the pictorial and algebraic representations?
2. To what extent does the discourse facilitate students' explanations or clarifications of their thinking?
3. To what extent does the discourse make mathematics more visible and accessible for student examination and discussion?

You can access and download the videos and their transcripts by visiting NCTM's More4U website (nctm.org/more4u). The access code can be found on the title page of this book.

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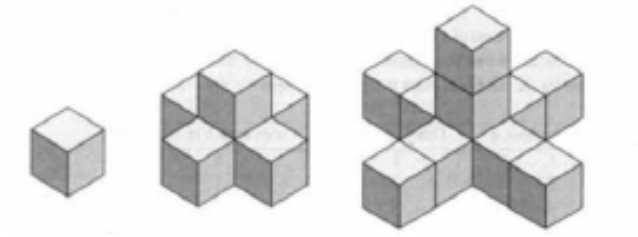
The Counting Cubes Task



1 2 3

1. Describe a pattern that you see in the cube buildings.
2. Use your pattern to write an expression for the number of cubes in the *n*th building.
3. Use your expression to find the number of cubes in the fifth building. Check your results by constructing the fifth building and counting the cubes.
4. Look for a different pattern in the buildings. Describe the pattern, and use it to write a different expression for the number of cubes in the *n*th building.

Adapted from Lappan et al. (2004a).

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