

# Problem Patterns

Grade 2

Activity #224

**Relevant Chapters in the *Digi-Block Comprehensive Teacher's Guides*:**

Book II, Unit 3-4: Finding Sums, pages 71 - 75

Book III, Unit 2-3: Finding Sums, pages 54 - 58

## Overview

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Students develop a sense of number and operations as they use blocks to identify patterns in sets of problems to name sums.

## Objectives

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**Thinking Skills:** Students describe the relationship of problems in a set and use reasoning to determine sums. They discover properties of addition and develop mental math strategies.

**Mastery Skills:** Students learn to predict sums by using patterns identified in related problems. They check predictions with blocks.

## Materials

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Each pair of students needs:

- Supply of blocks-of-10 and single blocks
- "Problem Patterns I" Activity Sheet

## Class Introduction

(20 minutes)

Explain to students that they will use blocks to model sets of problems. They will look for patterns in the number sentences to help them develop mental math strategies and to learn about important properties of addition.

Present and discuss the following three sets of problems.

### Problem Set #1

- Begin with these problems:  
 $4 + 5 = \underline{\quad}$   
 $14 + 5 = \underline{\quad}$
- Next, reveal the problems:  
 $24 + 5 = \underline{\quad}$   
 $34 + 5 = \underline{\quad}$   
 $44 + 5 = \underline{\quad}$
- Have students use blocks to show the different sums.
- Ask, **How did you use your blocks to show each problem?** Have students explain that all they needed to do was add a block-of-10 to the first addend as they progressed through the set.
- Ask, **What patterns do you notice in the problems? How are they related? What patterns do you see in the sums?**
- Help students explain that *as the first addend is increased by 10, the sum is increased by 10.* (Record this observation in students' own words.)
- Ask, **What should be the next problem in the set? Why do you think so?** As a class, extend the pattern and predict each sum.

Challenge students to think about larger problems such as:

$$84 + 5 = \underline{\quad}$$
$$94 + 5 = \underline{\quad}$$
$$104 + 5 = \underline{\quad}$$

### Problem Set #2

- Have students use their blocks to model:  
 $26 + 32 = \underline{\quad}$
- Discuss the sum, 58, or 5 blocks-of-10 and 8 ones.
- Next, show the problems:  
 $26 + 33 = \underline{\quad}$   
 $26 + 34 = \underline{\quad}$

$$26 + 35 = \underline{\quad\quad}$$

- Have students describe the pattern they see in the problems. Record their thinking. For example: *As the second addend increases by one, the sum increases by one.*
- Ask students to find the sum of each and explain how they did it.
- Verify predictions with blocks. Students will notice that they need to regroup as they model the last two problems in the set. Ask, **Was it easier to use the pattern to name the sum, or use the blocks?**
- Have them name the next problem(s) in the set ( $26 + 36$ ,  $26 + 37$ , ...) and predict the sum of each.
- Tell students that sometimes a simpler related problem can help them solve a harder one!

### Problem Set #3

- Display the final set of problems, beginning with:  
 $20 + 40 = \underline{\quad\quad}$
- Have students determine the sum mentally, or with blocks.
- Next, show:  
 $19 + 41 = \underline{\quad\quad}$   
 $18 + 42 = \underline{\quad\quad}$   
 $17 + 43 = \underline{\quad\quad}$
- Have students discuss this problem set. Use questions from the previous examples.
- Students should notice the "taking and giving" from one addend to the other. They should see that it does not affect the sum! This idea of compensation can be modeled easily with the blocks.
- Have them summarize their ideas. For example: *Taking one block from one addend and putting it with the other addend doesn't change the sum.*
- Have students name the next problem(s) in the set ( $16 + 44$ ,  $15 + 43$ , . . .) and predict the sum of each.

### Activity

(15 minutes)

Explain to students that they will continue to identify patterns to help them solve sets of problems. Distribute the "Problem Patterns I" activity sheet to pairs of students.

Give students directions to:

- Look for a pattern in each problem set.
- Use the pattern to predict each sum.
- Extend the pattern for a few more instances.
- Check the problems with blocks.
- Describe the pattern.

Emphasize the following:

- Students need to describe the pattern that they see in the problems.
- They should try to predict the sums first, and then use blocks to check their thinking.
- Even though students may solve the problems mentally, the blocks will help them describe what they are doing in their minds, and thus help them describe the pattern!

Early finishers can create and describe a problem set of their own!

### **Closure**

**(10 minutes)**

Ask students to describe the problem patterns on the activity sheet. Have them discuss how the patterns helped them predict the sums. As a class, name two or three additional problems to extend each set.

### **Assessment**

As students are working, observe and note the following. Do they:

- Recognize the pattern in each set?
- Use the pattern to help them name each sum mentally, or do they rely on blocks to determine the answer?
- Describe the pattern accurately?
- Extend the pattern?

### **Extension**

- Conduct a similar lesson using subtraction problems. Provide students with a copy of the "Problem Patterns II" Activity Sheet.