

Place Value Designs with Pattern Blocks

Strand: Number and Number Sense

Topic: Counting and writing numerals from 0 to 110

Primary SOL: 1.2 The student, given a collection of 110 objects, will
a) group a collection into tens and ones and write the corresponding numeral

Related SOL: 1.1a, 1.1b, 1.5a, 1.5b, 1.11

Materials

- Pattern blocks in bags to match the number of groups, up to 110 per bag (Pattern blocks projected with an overhead or document camera or magnetized pattern blocks are options for the modeling.)
- Recording sheets (attached) – one per group

Vocabulary

count, grouping, groups of ten, number, ones, place, place value, regrouping, tens, value, set

Student/Teacher Actions: What should students be doing? What should teachers be doing?

1. Show students various bags of pattern blocks. Ask students: *“How many blocks do you think may be in the bags? How would you know? What can you do to find out?”* (Most students will say, “Count them.” You may want to suggest that counting by ones will take a *long* time and that they may make a mistake.) Suggest: *“Let’s try another way.”*
2. Explain to students that they are going to make as many designs as they can using 10 pattern blocks. Each design will use 10 blocks and may include more than one color or shape. At this point, you should model several designs using 10 blocks. Be sure to ask students to comment on each design as it is completed. You can discuss the number of squares, triangles, trapezoids, rhombi, and hexagons used in the design. Students may notice that designs with lots of hexagons look bigger than designs with lots of triangles. Verify that each design has exactly ten blocks.
3. After modeling several designs, distribute the pattern blocks into small cooperative groups, and have the students continue making different designs using 10 blocks. As you monitor the groups, Ask, *“How many different designs have you made? How many blocks did you use? How do you know? Do you have any leftover blocks that aren’t in a design? How could that be written? Is there another way to write it? How do you know? How is that the same or different?”* This information should be recorded using the attached recording sheet and left face down on the table with the cooperative group.
4. Bring all students back together for a discussion. Use the following questions: *When you made designs using ten pattern blocks, how did that help you figure out how many blocks you had? Why did you have to count by tens? What did you do with the leftover blocks? Were they included in your total? How did you include them? Which do you think is faster – counting by ones or counting by tens and ones?*
5. Finally, go on a gallery walk around the classroom to allow the students to see the other designs. At each station, stop to determine the number of designs, number of leftover

blocks and the total number of blocks. Turn over the recording sheet to see if what you've determined as a class matches what the group determined. As you discuss the number of blocks at each station, ask students what they notice about the relationships between the number of designs, the number of leftover blocks, and the way the total number of blocks is written.

Assessment

- **Questions**
 - What did you do in this activity to speed up counting?
 - How does this help you know how many blocks you have in your bag? What are other things you may want to count by tens?
 - Look at the numeral 40. What does the 4 represent? What does the 0 represent? (four groups of 10; zero ones)
 - If I had 34 stickers, how many groups of 10 do you think I could make? Will I have any leftovers? Explain how you know.
- **Journal/writing prompts**
 - I have five packages of 10 pencils and three more pencils. Show and tell how you can figure out how many pencils I have all together.
 - You have 58 marbles, and I give you two (or any number) more. How many groups of tens would you have and how many single ones are left? Use a place-value table to prove your answer.
 - I have three groups of 10 and two ones, what is my number?
- **Other Assessments**
 - Make observations while groups are counting and regrouping objects.
 - During center rotations, included a teacher center where students count a random collection of groupable place-value materials on a place-value mat, recording how many tens and ones they have and the numeral representation.

Extensions and Connections (for all students)

- Set up part of the bulletin board as an “Estimation Station.” Each week, have a different student take home a “Estimating Jar” and fill it with items to estimate the total. The objects can then be grouped by tens and counted to determine the actual count for additional place-value practice.

Strategies for Differentiation

- Pair students to help support each other's learning.
- Begin working with small amounts of items to group and count, increasing the number of items to be counted as students demonstrate readiness.
- Provide a sentence frame: “I have ____ groups of ten, and I have ____ ones. I have ____ in all.” Have students use the sentence frame to record the results of their grouping and counting experiences.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

Place Value Designs with Pattern Blocks

We made _____ designs with ten blocks.

We had _____ leftover blocks.

We had a total of _____ blocks.

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