

Understanding Expanded Notation

Teacher Guide

Duration: 20 minutes

Standards for Mathematics

TEKS.4.2.B.i

Represent the value of the digit in whole numbers through 1,000,000,000 using expanded notation.

Focus Strategies

Think Aloud: The teacher models a process of thinking by speaking aloud what is thought. As an example, 'I think I need more color here in my drawing.' This strategy models for students the type of thinking they can use in an upcoming activity.

Think-Pair-Share: Students are prompted to think about an idea on their own. Students then share their idea with a partner and have a quick discussion. Selected students are asked to share their ideas with the whole group.

Materials

whiteboard with the numbers 1,001,001,000, 1,100,000,100 1,000,100,000 written on it, markers, student notebooks

Key Vocabulary

digit, value, expanded notation, whole number, place value

Warm-Up

Have students write the number 1,234,567 on their whiteboards. Ask students to identify the place value of each digit. Allow 2 minutes for this task and then have a few students share their answers.

Introduction

Explain to students that today they will learn how to use language to describe large numbers. Tell students they will try to match the expanded form of a number to the number in standard form, then write the remaining number in standard form.

Exploration & Whole Class Discussion

Point at the three numbers on the whiteboard written in standard form. Ask students to see what they notice about the numbers. Write down the expanded form for these three numbers plus the standard form for 1,202,202,200 in random order. Ask students to work with a partner to make matches between the expanded form and the standard form of the numbers. Tell them one of the standard forms will be missing a match. Once students make their matches, have selected students share their matches with the class.

Application & Reflection

Ask students to work with their partner to make the standard form for the number in expanded form not matched. Have selected students present their number to the class and explain why it is a match.

Assessment

Ask students to write a reflection with a choice of prompts, either: "What is important to pay attention to in numbers?" or "How do we use the expanded form of a number to represent a number in standard form?"

Strategies to Support Emergent Bilingual Students

To support emergent bilingual students, we recommend the following:

1. Provide independent think time after asking questions or posing prompts.
2. Have students pair up with a partner to generate responses together.
3. Have students restate each other's reasoning in classroom discussions.
4. Create a public record of classroom discussions.
5. Use color and annotation to help learners make connections for concepts.
6. Introduce academic vocabulary as needed.
7. Use iconic and semantic gestures to help students understand.

Additional Support Resources

If your students need additional support, you can click on one of the lessons below and present it to your whole class. You can use the interactive manipulatives and built in feedback to support students in a whole class discussion. Good questions to ask are 'What do you see?', 'What do you think?' 'What do you wonder?'



Representing Numbers in Expanded Forms with Place Values to Hundred Thousands



Representing Numbers in Expanded Forms with Place Values to Ten Thousands

Sample Lesson Flow

- TEACHER SAY** *Today we are going to learn how to use expanded form to represent large numbers. First, let's warm up by looking at a problem.*
- TEACHER DO** Write this number on the whiteboard: 1,234,567
- TEACHER SAY** *Identify the place value for each digit in this number.*
- TEACHER DO** Point at the number.
- STUDENTS DO** Solve the problems and raise hands when ready.
- TEACHER DO** Call on students to share their answers.
- TEACHER SAY** *Great job! Now, let's look at some other numbers.*
- TEACHER DO** Display the three numbers on the board.
- TEACHER SAY** *What do you notice about these numbers? Turn to your shoulder partner and discuss your observations.*
- STUDENTS DO** Turn and talk with shoulder partner about the numbers.
- TEACHER DO** While students talk, write the expanded form for four numbers on the board in random order, including the expanded form for 1,101,101,100.
- TEACHER DO** While saying the numbers, point at them on the white board.
- TEACHER SAY** *Now, let's match these numbers in standard form to these expanded forms of numbers. Work with your partner to make the matches. Remember, one number in expanded form will not have a match.*
- TEACHER DO** Give students time to work. Circulate around the room as students work and select 2-3 pairs of students to share their matches.
- TEACHER SAY** *Okay, these students are going to share their matches.*
- STUDENTS DO** Selected students share their matches with the class.
- TEACHER DO** Prompt students to share their complete reasoning if necessary. Have students restate each other's reasoning. Use annotation and colour to make the connections between the numbers in standard and expanded form clear.
- TEACHER SAY** *Excellent work! Now, let's create the missing number in standard form for this number in expanded form. Work with your partner to write down the number in standard form.*
- TEACHER DO** Give students time to work with their partners.
- TEACHER SAY** *Who would like to present their number and explain their reasoning?*
- STUDENTS DO** Selected students present their number in standard form to the class.
- TEACHER SAY** *To wrap up, I want you to reflect on what we learned today. You can choose one of these prompts: 'What is important to pay attention to in numbers in standard form?' or 'How do we represent numbers in expanded form?'*

TEACHER DO Walk around and read over students' shoulders as they write their reflections. Select one or two reflection prompts and ask students to share them with the class.

TEACHER SAY *Thank you for your hard work today!*