

Understanding Expanded Notation with Decimals

Teacher Guide

Duration: 20 minutes

Standards for Mathematics

TEKS.4.2.B.iii

Represent the value of the digit in decimals to the hundredths 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 1.01, 10.1, 0.11, 1.10 written on it in word format, markers, student notebooks

Key Vocabulary

decimal, expanded notation, hundredths, place value

Warm-Up

Ask students to identify which is larger - one tenth or one hundredth - and explain why.

Introduction

Explain to students that today they will learn how to use use language to describe small numbers. Tell students they will try to match the expanded notation to the number, then write their expanded notation for the number without a match.

Exploration & Whole Class Discussion

Point at the four numbers in standard form on the whiteboard. Ask students to see what they notice about the numbers. Write down the expanded form for 3 of these numbers 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 missing expanded for the standard 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 expanded form to represent numbers with decimals?"

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 Ones to Hundredths



Representing Numbers in Expanded Fractional Forms with Place Values Tens to Tenths

Sample Lesson Flow

- TEACHER SAY** *Today we are going to explore how to represent decimal numbers using expanded notation. First, let's do a warm-up question. Which is larger: one tenth or one hundredth? Think for a moment on your own, then discuss with a partner.*
- STUDENTS DO** Think for a moment on their own, and then turn and share their reasoning with a partner.
- TEACHER DO** Call on a few students to share their answers.
- TEACHER SAY** *Great! One tenth is larger than one hundredth because it describes larger pieces of the whole.*
- TEACHER DO** Display the four numbers (1.01, 10.1, 0.11, and 1.10) written in standard form 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 3 of the numbers in word form on the board in random order.
- 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 these decimal 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 expanded form for this number in standard form. Work with your partner to write down the number in expanded 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 expanded 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!*