

# 5th Grade Math

## Unit 4: Decimal place value

5.2A, 5.2B, 5.2C

Understanding and being able to work with decimals is foundational to students' numeracy—they'll continue to work with decimals, both inside and outside of the classroom, for the rest of their lives!

- Identify the value of a digit through the **thousandths** place
- Locate **decimals on a number line**
- Compare and **order decimals** to the thousandths
- Write decimals in **expanded form**
- Round** decimals to the ones, tenths, or hundredths



TEKS standards	Common misconceptions
<p><b>5.2A:</b> Represent the value of the digit in decimals through the thousandths using expanded notation and numerals</p>	<p><b>Misunderstanding place value</b>   Some students might think that 0.25 is greater than 0.5 because 25 is greater than 5. This stems from a misunderstanding of place value and what each place represents.</p> <p><b>How to help:</b> Demonstrate for students what each place value represents using blocks or tiles. Additionally, have students use a place value chart when representing decimals and ensure that both decimals have the same number of digits by adding zeros. Having students say the number out loud can help, too. For example, if a student says “twenty five hundredths” and “five tenths” (and writes these as fractions), that can help them to correctly reason which one is bigger.</p> <p><b>“I can ignore the zero”</b>   Students might be tempted to ignore zeros that they see in numbers - instead of treating them as important place holders. For example, <math>3.45 \neq 3.045</math>—students might think they can simply drop the zero instead of understanding that it means that there are zero tenths.</p> <p><b>How to help:</b> This is likely a place value misunderstanding. Having students say the numbers out loud can be helpful as well as writing them as fractions. Practice with this <a href="#">Decimal place value graphic organizer</a> can also help students get in the habit of paying attention to zeros.</p>
<p><b>5.2B:</b> Compare and order two decimals to thousandths and represent comparisons using the symbols <math>&gt;</math>, <math>&lt;</math>, or <math>=</math></p>	
<p><b>5.2C:</b> Round decimals to tenths or hundredths</p>	

**Identifying digits for rounding** | Sometimes students struggle with identifying which digit to look at when deciding to round up or down. For example, when rounding 0.48 to the nearest tenth, students need to recognize that the number in the hundredths place, the 8, is the number that will determine whether to round up or down.

**How to help:** To help students develop a clear understanding of place value, it's helpful to use a consistent notation when rounding. Using a vertical number line can be helpful, particularly for rounding. See the “Best practices” section for more information about this.

**Rounding to the next place value** | It can be confusing for students when they are asked to round 0.97 to the nearest tenth. When we round this example, the 7 in the hundredths place tells us to round the 9 in the tenths place up—that means that the number will round to 1 (or 1.0). Students can find it confusing because the rounded number seems so different from the original number. This can hold true for rounding down. For example, rounding 0.35 to the nearest whole number would result in an answer of 0.

**How to help:** Graphing numbers on a vertical number line can help students to see which value that number is closest to and why it makes sense to round to that number. Give students plenty of practice with this!

**“Adding zeros to the right of a decimal changes the value”** | Students will sometimes think that adding zeros to the right of a decimal changes the value. For example, they may think that 0.50 is greater than 0.5. The better students understand place value, the less likely they are to make this mistake.







**How to help:** Have students write the decimals as fractions and see that they are equivalent.












## Unit resources

- Use this [Decimal place value graphic organizer](#) for students to work on single problems. It can be placed in a sheet protector with dry erase markers to be used repeatedly.
- Use this [Decimal place value worksheet](#) for some of the exercises involving place value, for extra practice, or as a reminder to students of what the place values are called.
- Use this [Horizontal number line worksheet](#) to give students extra practice in placing numbers on a number line, particularly in Lesson 2. You can also use this [Horizontal number line graphic organizer](#) in a sheet protector so students can use dry erase markers to solve the problems.
- Use this [Horizontal number line rounding worksheet](#) or [Vertical number line rounding worksheet](#) to use with exercises in Lesson 5.
- For the videos in this unit, use the [Learning summary video notetaking guide](#).
- For the articles in this unit, use the [Article notetaking guide](#).
- For the exercises in this unit, use the [Blank workspace template](#).
- To record key terms and information, use the [Vocabulary and notation notetaker](#).

## Lesson overview

Lesson	Objective	Teaching tips
<p><b>Lesson 1: Decimal place value</b></p> <p>TEKS standard: 5.2A</p> <p>Video  1    Article  1    Exercise  2</p>	<p>Students will be able to identify the place value of digits in numbers including thousands through thousandths.</p>	<ul style="list-style-type: none"> <li>• Many students struggle with place value. Watch the video together and discuss the vocabulary, stopping often to check for understanding. This is a great topic for an anchor chart or poster.</li> <li>• The <a href="#">Decimal place value graphic organizer</a> can be used for the exercises and also give students extra practice with place value problems that you create.</li> </ul>
<p><b>Lesson 2: Decimals on the number line</b></p> <p>TEKS standard: 5.2A</p> <p>Video  1    Article  0    Exercise  1</p>	<p>Students will be able to place rational numbers written as decimals on the number line.</p>	<ul style="list-style-type: none"> <li>• Use teacher-led grouping to provide support to students before moving onto more challenging topics with decimals.</li> <li>• Use this <a href="#">Horizontal number line worksheet</a> for extra practice. You can give students labeled number lines with a point to find the value of or give them a decimal and ask them to graph it.</li> </ul>
<p><b>Lesson 3: Decimals in expanded form</b></p> <p>TEKS standard: 5.2A</p>	<p>Students will be able to write decimals in expanded form.</p>	<ul style="list-style-type: none"> <li>• Do some examples with students after the video to make sure they are prepared for the exercise. Students may be confused with expanded form and writing out the place values with multiplication.</li> </ul>

<p>Video Article Exercise</p> <p>  </p> <p>1 1 1</p>		<p>See <b>Best practices</b>, below, for more on expanded form.</p> <ul style="list-style-type: none"> <li>As in Lesson 1, the <a href="#">Decimal place value graphic organizer</a> can help answer questions and provide extra practice.</li> </ul>
<p><b>Lesson 4: Comparing decimals</b></p> <p>TEKS standard: 5.2B</p> <p>Video Article Exercise</p> <p>  </p> <p>5 0 3</p>	<p>Students will be able to determine how decimals compare to each other and use inequality symbols to show their relationship.</p>	<ul style="list-style-type: none"> <li>As a warmup, give students pairs of numbers (write the numbers on the board, pass out a paper with them, say them out loud, etc.) and have them use <math>&gt;</math>, <math>&lt;</math>, or <math>=</math> to show their relationship. They may need to review inequalities and this will prepare them for the first video and exercise.</li> <li>For students who are having difficulty with comparing decimals, it might help to show them how to line up the numbers vertically, as Sal does in the fifth video, “Comparing decimals word problems.” The strategy can help students to more easily compare the numbers in corresponding places.</li> </ul>
<p><b>Lesson 5: Rounding decimals</b></p> <p>TEKS standard: 5.2A, 5.2C</p> <p>Video Article Exercise</p> <p>  </p> <p>3 0 4</p>	<p>Students will be able to round decimals to the nearest whole number, tenth, or hundredth.</p>	<ul style="list-style-type: none"> <li>As a warmup, ask students to round integers to the nearest one, ten, or hundred. This will prepare them for the rounding that they’ll see in the first video, with decimals.</li> <li>Remind students to read carefully, as they don’t want to confuse tens with tenths, etc.</li> <li>Determine a notation that you want students to use when they round as it will be helpful for students to have consistency. See the <b>Best practices</b>, below, for more on this.</li> </ul>

**TRY THIS WITH YOUR STUDENTS**

# Best practices

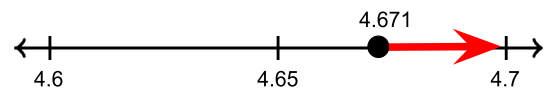


## EXPERT INSIGHTS

### Rounding visually

In this unit, our goal is to build students' conceptual understanding of rounding. Emphasize using a number line, either horizontal or vertical, to round. Students will place the given decimal on a number line and determine how to round by the number's position in relation to the nearest whole number. Don't simply tell students how to round numbers at this stage—that will come later. For numbers that are exactly halfway between, the rule is to round up. Take a look at the following examples.

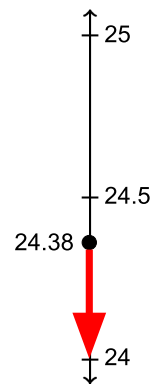
1. Round 4.671 to the nearest tenth.



First, we need to place 4.671 on a number line between its nearest tenths. The number 4.671 has 6 tenths, so it will round to either 4.6 or 4.7. We place those on the outer tick marks. 4.65 falls halfway between so that goes on the middle tick mark. 4.671 is close to 4.675, which is halfway between 4.65 and 4.7, but a little closer to 4.65. Since 4.671 is closer to 4.7 than it is to 4.6, it will round to 4.7. The decimal 4.671 rounded to the nearest tenth is 4.7.

2. Round 24.38 to the nearest whole number. Let's use a vertical number line this time.

First, we need to place 24.38 on a number line between its nearest whole numbers, 24 and 25. Since 24.38 is between 24.25 and 24.5, we will place it on the number line between those numbers. Since we can see that 24.38 is closer to 24 than to 25, we will round down. You can see that by using a vertical number line, we are literally rounding down.



### Example: Decimals in expanded form

Writing decimals in expanded form may seem tricky, but it helps students understand the value of each digit in a decimal number. Students first identify the place value of each digit and then write each digit out with its value. Students may have done work like this before with place value blocks or tiles. Let's look at an example:

Write 436.807 in expanded form.

First, let's use the place value chart to identify the place value of each digit.

100	10	1	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
Hundreds	Tens	Ones	.	Tenths	Hundredths	Thousandths
4	3	6	.	8	0	7

4 hundreds + 3 tens + 6 ones + 8 tenths + 0 hundredths + 7 thousandths

Expanded form:  $(4 \times 100) + (3 \times 10) + (6 \times 1) + \left(8 \times \frac{1}{10}\right) + \left(0 \times \frac{1}{100}\right) + \left(7 \times \frac{1}{1000}\right)$

Simplified expanded form:  $400 + 30 + 6 + \frac{8}{10} + \frac{7}{1000}$

## PRO TIPS

### Number line warm ups

Placing numbers on a number line is foundational in students' numeracy. Creating a large number line that students can physically place numbers on can be a powerful learning tool. For this unit, you might want to create a long number line that spans the length of the board, where students can come up to locate various numbers. Another idea is to create a number line out of string and have students attach numbers with clothespins or write numbers on a folded paper that sits on the string. Start with integers and move into basic decimals (0.25, 1.5, etc.) and then give them more challenging decimals like they will see in Lesson 2. For additional individual practice, use this [Horizontal number line graphic organizer](#) in a sheet protector with dry erase markers so students can solve problems quickly without having to make their own number lines.

### Practice, practice, practice!

The more practice students can get with placing numbers on a number line, ordering numbers, and working with decimals in general, the stronger their foundational numeracy will be and the more comfortable they will be working with decimals in the future. The more practice, the better!

## GENERAL CLASSROOM IMPLEMENTATION RESOURCES:

- [Weekly Khan Academy quick planning guide](#): Use this template to plan your week using Khan Academy.
- [Using Khan Academy in the classroom](#): Learn teaching techniques and strategies to support your students and save time with Khan Academy.
- [Differentiation strategies for the classroom](#): Discover strategies to support the learning of all students.