Unit 5: Adding decimals

5.3A, 5.3K

In this unit, students build on their understanding of place value and whole number addition to explore conceptual strategies for adding decimals—something that comes in handy in real life, especially when working with MONEY!

- Add decimals with tenths, hundredths, and thousandths
- Use a variety of concept-building strategies to add decimals

<table>
<thead>
<tr>
<th>TEKS standards</th>
<th>Common misconceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3A: Estimate to determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, or division</td>
<td>Ignoring the decimal point</td>
</tr>
<tr>
<td>5.3K: Add and subtract positive rational numbers fluently</td>
<td>Using “tricks” is faster</td>
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</tbody>
</table>
Unit resources

- Use this Decimal addition graphic organizer in Lessons 2, 3, and 4 to help students correctly align numbers for addition. It can be placed in a sheet protector with dry erase markers to be used repeatedly.
- These place value grids will be useful for students to add decimals visually. Here is one for tenths, hundredths, and thousandths.
- 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

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Objective</th>
<th>Teaching tips</th>
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</table>
| Lesson 1: Estimating decimal addition | Students will be able to estimate addition problems that involve decimals. | • This lesson is all about giving students room to explore with estimating decimal addition. See what they are able to come up with on their own before showing them any methods or telling them how to do problems! Have multiple students share their strategies with the class. The decimal square grids handouts linked above in “Unit resources” may be helpful.  
• The last exercise uses base 10 tile models so it would be helpful to review those, or use them to solve previous problems. |
| TEKS standard: 5.3A, 5.3K | | |
| Video | Article | Exercise |
| 2 | 1 | 3 |
| Lesson 2: Adding decimals (tenths) | Students will be able to add decimals (tenths) using multiple strategies. | • In this lesson, students will add decimals (tenths) together using four different strategies: decomposing, place value tables, place value grids, and words. We WON’T teach students the Standard Algorithm for adding decimals—yet! This lesson builds their conceptual understanding. See “Best practices” for information on these methods.  
• Be sure that students have a workspace when solving these problems. They have a choice of strategies to use so the Blank workspace template will be helpful. |
<p>| TEKS standard: 5.3K | | |
| Video | Article | Exercise |
| 2 | 0 | 3 |</p>
<table>
<thead>
<tr>
<th>Lesson 3: Adding decimals (hundredths)</th>
<th>Students will be able to add decimals to the hundredths place.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEKS standard: 5.3K</td>
<td>• Students will continue to add decimals—this time to the hundredths place. They can use the conceptual strategy of their choice (they still have not been introduced to the Standard Algorithm). If a student is struggling with one of the methods, have them try the problem using one of the other strategies.</td>
</tr>
<tr>
<td>Video 2</td>
<td>Article 0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lesson 4: Adding decimals (thousandths)</th>
<th>Students will be able to add decimals to the thousandths place.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEKS standard: 5.3K</td>
<td>• The Standard Algorithm is introduced to students in this lesson. Students will rely on what they learned in lessons 1 (Whole number operations) and 4 (Decimal place value) to correctly align the two numbers being added and follow through the adding procedure correctly (especially when carrying digits). Use this lesson to bring together their previous learnings to make new connections.</td>
</tr>
<tr>
<td>Video 4</td>
<td>Article 0</td>
</tr>
</tbody>
</table>
Best practices

EXPERT INSIGHT

Conceptual understanding is key
You might be tempted to jump right in and show students how to use the Standard Algorithm for addition, but don’t yet! This unit is all about building students’ understanding. In the first three lessons, students explore decimal addition using their knowledge of addition and place value from previous units. They should have time to explore intuitive methods—and there are four different conceptual strategies you can show students: words, decomposing, place value grids, and place value tables. Each method has pros and cons in different situations, so also discuss this with students.

Place value strategy (words)
Students can say or write the decimals out in words to add the quantities together. This method works best when both of the decimals have the same place value. Here are two examples:

\[
\begin{align*}
0.1 + 0.8 &= 1 \text{ tenth} + 8 \text{ tenths} \\
0.3 + 0.9 &= 3 \text{ tenths} + 9 \text{ tenths} \\
0.1 + 0.8 &= 9 \text{ tenths} \\
0.3 + 0.9 &= 12 \text{ tenths} \\
0.1 + 0.8 &= 0.9 \\
0.3 + 0.9 &= 1.2
\end{align*}
\]

Decomposing
When using decomposition, group digits of the same place value together and add them, then add up all of the components together. Here are two examples:

\[
\begin{align*}
9 + 6.4 &= (9 + 6) + 0.4 \\
74.7 + 3.9 &= (74 + 3) + (0.7 + 0.9) \\
9 + 6.4 &= 15 + 0.4 \\
74.7 + 3.9 &= 77 + 1.6 \\
9 + 6.4 &= 15.4 \\
74.7 + 3.9 &= 78.6
\end{align*}
\]

Place value grid
The place value grid may be the most familiar to students as they likely have been working with place value grids for many years. See the example:

\[
\begin{align*}
0.2 &= \begin{array}{c}
\text{0} \text{ tenths}
\end{array} \\
0.5 &= \begin{array}{c}
\text{0} \text{ tenths} \\
\text{5} \text{ tenths}
\end{array} \\
0.2 + 0.5 &= \begin{array}{c}
\text{0} \text{ tenths} \\
\text{2} \text{ tenths} \\
\text{5} \text{ tenths}
\end{array} = 0.7
\end{align*}
\]
Place value table
This method uses the place value tables that students saw in Unit 1. They can add columns to the table for each number and then add vertically. See the example:

\[
7.57 + 8.4 =
\]

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
<th>.</th>
<th>Tenths</th>
<th>Hundredths</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>5</td>
<td>.</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

\[
+ 1     8 \quad 8 \quad . \quad 4 \quad 0
\]

\[
9 \quad 5 \quad . \quad 9 \quad 7
\]

Enter each number into the place value table and then add vertically.

It’s important for students to use the chart so they are really clear on the place value for each digit.

This method can build into the Standard Algorithm, but give students plenty of practice with this, first.

PRO TIPS

Use blocks
Have base ten blocks accessible for students to use when solving these problems. They will see base ten block images in some of the videos and exercises and it is also a good idea to have them accessible for students who prefer a physical model.

Anchor chart
Make a poster to hang in your classroom with the place values labeled, like a place value table. This will give students a quick reference for place value as they work on problems and will help to automatize the names and values of each place.

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.