

Add and Subtract Decimals

Unit 2 Overview: 5 lessons

Students add and subtract decimals to hundredths, first on hundred grids, where a model shows the equation, then in columns with the decimal points lined up, writing zeros in empty places and regrouping as with whole numbers. They estimate first by rounding to whole numbers and use the estimate to judge an answer, add and subtract money for totals, change and the better buy, and solve one- and two-step stories. The unit follows place value at once: lining up the points is lining up the places. Classes whose standards ask for it go on to thousandths in lesson 2.2.

THE UNIT, DAY BY DAY

Day 1	Pre-Check	What students already know, before the first lesson.
Day 2	2.1 Add and subtract on hundred grids	I can add and subtract decimals with models.
Day 3	2.2 Line up the decimal points	I can add and subtract decimals in columns.
Day 4	2.3 Estimate first	I can estimate to check a decimal answer.
Day 5	2.4 Money: totals, change and the better buy	I can add and subtract money.
Day 6	2.5 Decimal story problems	I can solve decimal stories.
Day 7	Unit Review	The review, to go over together.
Day 8	Unit Test	Form A; Form B (other numbers) is for a retest.

GET READY FOR THE UNIT

- Hundred grids, plenty of them, and colored pencils in two colors
- Grid paper for lining up the decimal points
- Base-ten blocks: a flat as 1 whole, a rod as a tenth, a small cube as a hundredth
- Play money (bills, dimes and pennies), price tags and blank receipts
- Whiteboards and dry erase markers

HOW EACH LESSON GOES

- 1. Warm up** (5 min)
 - 2. Teach** (10 min)
 - 3. Try it together** (10 min)
 - 4. Practice** (15 min)
 - 5. Exit ticket** (5 min): a quick check on the lesson.
- Each lesson page ends with the Animal Math sheets, makers, tools and quizzes for it. “Sheet 3” is the third worksheet of a pack; a color pack prints each sheet again in black and white.

CHECKING AS YOU GO

PRINTABLE	Pre-Check: Day 1, with a key	EXIT TICKET	Exit Tickets: one a lesson, two to a page
PRINTABLE	Unit Review: the day before the test	PRINTABLE	Unit Test: Forms A and B, with keys

Add and Subtract Decimals

Lesson 2.1: Add and subtract on hundred grids

GOAL Students add and subtract decimals on hundred grids, shading to add and crossing out to subtract, and write the equation a model shows.

About 45 minutes

I can add and subtract decimals with models.

THE LESSON

- 1 Warm up** (5 min) Show a grid with 3 columns and 4 more squares shaded. Students write the decimal and say it in hundredths: 0.34, 34 hundredths.
- 2 Teach** (10 min) Shade 0.34 on a hundred grid: 3 columns and 4 squares. Shade 0.5 in a new color: 5 more columns. Count 84 squares: $0.34 + 0.5 = 0.84$. Next, $0.86 + 0.39$: 14 squares fill the first grid and 25 spill onto a second, so the sum is 1.25. To subtract, $0.91 - 0.37$: shade 91 squares, cross out 37 and count what is left, 0.54.
Say: "Tenths are columns and hundredths are squares. To add, I count everything shaded. To subtract, I count what is shaded and not crossed out."
- 3 Try it together** (10 min) Show a grid with 0.8 shaded and 25 squares crossed out; pairs write the equation, $0.8 - 0.25 = 0.55$. Then pairs shade $0.18 + 0.6$, $0.95 - 0.7$ and $0.79 + 0.44$ and write each equation.
- 4 Practice** (15 min) Students shade to add, cross out to subtract and write the equations the models show on sheet 1 of Adding and Subtracting Decimals. Early finishers draw a model for a partner to write as an equation.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 2.1** and circle a face beside the "I can" line. On question 1, look for $0.62 - 0.27 = 0.35$; $0.62 + 0.27 = 0.89$ means the crossed out part was added. On question 2, look for 1.18, with one grid full and 18 squares on the second; 0.55 means the 7 tenths were shaded as 7 hundredths.

Ready for more? Find three pairs of decimals in hundredths that add to exactly 1.

GET READY

- Hundred grids, several for each student
- Colored pencils in two colors

WORDS TO USE

hundred grid: a whole cut into 100 equal squares; each square is 0.01

sum: the answer to an adding problem

difference: the answer to a subtracting problem

ASK

- How many columns and squares will you shade?
- What do you do when the first grid is full?
- What does the crossed out part show?

WATCH FOR

Shades 0.5 as 5 squares. 5 tenths is 5 columns: $0.5 = 0.50$.

Counts the crossed out squares as the difference. The difference is what is shaded and not crossed out.

Stops at one grid when a sum is more than 1. A full grid is 1 whole. Go on to a second grid.

Need help? Build the numbers with base-ten blocks first, a flat as 1 whole, a rod as a tenth and a cube as a hundredth.

ON ANIMAL MATH

PRINTABLE

Adding and Subtracting Decimals: sheet 1

QUIZ

Decimal Operations Quiz: the Add and Subtract level

EXIT TICKET

5th Grade Adding and Subtracting Decimals Exit Tickets: Exit Ticket 2.1

Add and Subtract Decimals

Lesson 2.2: Line up the decimal points

GOAL Students add and subtract decimals in columns with the decimal points lined up, writing zeros in empty places and regrouping as with whole numbers.

About 45 minutes

I can add and subtract decimals in columns.

THE LESSON

- 1 Warm up** (5 min) Students add $2,675 + 548$ in columns and say why the ones go under the ones.
- 2 Teach** (10 min) Write $18.4 + 6.57$ in columns with the points lined up, and write 18.4 as 18.40 . Add the hundredths, the tenths, then the ones ($8 + 6 = 14$: regroup a ten) and bring the point straight down: 24.97 . Then $11 - 3.47$: write 11 as 11.00 and trade across the zeros: 7.53 . Check by adding: $7.53 + 3.47 = 11.00$. Thousandths work the same way: $5.06 + 2.875 = 7.935$.
Say: "I line up the decimal points, not the last digits. Then I fill empty places with zeros and work each place as with whole numbers."
- 3 Try it together** (10 min) Pairs write $7.9 + 12.36$, $15.2 - 6.84$ and $9 - 2.73$ in columns on grid paper, solve, and check each difference by adding.
- 4 Practice** (15 min) Students write the problems in the boxes, then add and subtract in columns, on sheet 2 of Adding and Subtracting Decimals. Classes that go to thousandths, and early finishers, do the last row of sheet 4.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 2.2** and circle a face beside the "I can" line. On question 1, look for 32.35 and 8.38 ; 31.35 or 22.35 means a regrouped one was not added, and 9.62 means the 62 hundredths were brought down, not subtracted from 14.00 . On question 2, look for 22.18 ; 16.42 means 6.4 went one box too far right.

Ready for more? What number added to 4.13 makes 10 ? Find it by subtracting, then check by adding.

GET READY

- Grid paper, one digit a square
- Base-ten blocks for showing a regroup

WORDS TO USE

line up: put the decimal points one under the other

placeholder zero: a zero in an empty place:
 $18.4 = 18.40$

regroup: trade 10 of a place for 1 of the next place, or 1 for 10

ASK

- Where do the decimal points go?
- Why can you write a zero after 18.4 ?
- How can you check a difference?

WATCH FOR

Lines up the last digits, as with whole numbers.

Line up the points first, then write zeros so both numbers have the same places.

Brings the decimal part down: $11 - 3.47$ as 8.47 .
Write 11 as 11.00 , then trade across the zeros.

Need help? Use grid paper, one digit a square, or build both numbers with base-ten blocks first.

ON ANIMAL MATH

PRINTABLE **Adding and Subtracting Decimals:** sheet 2, and sheet 4, problems 10–12 (thousandths)

MAKER **Column Addition:** Numbers Decimals, Decimal Places Mixed Places, Range Within 100, Regrouping / Borrowing on

MAKER **Column Subtraction:** Numbers Decimals, Decimal Places Mixed Places, Range Within 100, Regrouping / Borrowing on

QUIZ **Decimal Operations Quiz:** the Add and Subtract level

EXIT TICKET **5th Grade Adding and Subtracting Decimals Exit Tickets:** Exit Ticket 2.2

Add and Subtract Decimals

Lesson 2.3: Estimate first

GOAL Students estimate a decimal sum or difference by rounding each number to the nearest whole number first, then use the estimate to decide whether an answer is reasonable.

About 45 minutes

I can estimate to check a decimal answer.

THE LESSON

- 1 Warm up** (5 min) Round 5.7, 8.24 and 0.6 to the nearest whole number. Which digit did you look at?
- 2 Teach** (10 min) Before working out $6.82 + 3.47$, round: 6.82 is about 7 and 3.47 about 3, so the sum is about 10. The exact sum, 10.29, is close to 10, so it is reasonable. Then a student says $6.2 + 2.53 = 3.15$. Estimate: $6 + 3 = 9$. 3.15 is far from 9, so it is not reasonable: the 6.2 was lined up under the hundredths. The exact sum is 8.73.
Say: "I round to whole numbers and find the estimate in my head first. If my answer is far from it, I look for the mistake."
- 3 Try it together** (10 min) Pairs estimate, then solve, $14.58 - 6.9$ and $9.47 + 2.6$. Then they judge two answers on the board: $7.4 - 2.18 = 5.22$ and $3.9 + 4.37 = 4.76$.
- 4 Practice** (15 min) Students estimate, then find the exact answers, in the table on sheet 4 of Adding and Subtracting Decimals, and decide which answers are reasonable. Early finishers write a wrong answer for a partner to catch with an estimate.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 2.3** and circle a face beside the "I can" line. On question 1, look for $10 - 4 = 6$; $9 - 4 = 5$ means 9.71 was cut off, not rounded. On question 2, look for $8 + 5 = 13$ and No circled; Yes means the answer was not compared with the estimate.

Ready for more? Can two numbers that round to 4 and 5 add to more than 10? Explain why or why not.

GET READY

- Blank number line strips
- Whiteboards and markers

WORDS TO USE

estimate: a number close to the answer, found with rounded numbers

reasonable: close to the estimate, so it makes sense

exact answer: the answer worked out with the real numbers

ASK

- Which whole number is it closer to?
- Is your answer close to your estimate?
- If it is far off, where could the mistake be?

WATCH FOR

Cuts off the decimal: 6.82 as 6. Look at the tenths digit: 8 is 5 or more, so 7.

Rounds the exact answer instead of the numbers. Round each number first; the estimate comes before the exact answer.

Need help? Place each number on a number line between two whole numbers before rounding it.

ON ANIMAL MATH

PRINTABLE

Adding and Subtracting Decimals: sheet 4

MAKER

Rounding Numbers: Round to Nearest Whole Number, for the rounding

QUIZ

Decimal Operations Quiz: the Add and Subtract level

EXIT TICKET

5th Grade Adding and Subtracting Decimals Exit Tickets: Exit Ticket 2.3

Add and Subtract Decimals

Lesson 2.4: Money: totals, change and the better buy

GOAL Students add prices for a total, find change by subtracting and check it by counting up, and compare a set price with the parts bought alone.

About 45 minutes

I can add and subtract money.

THE LESSON

- 1 Warm up** (5 min) Show \$3.08 in play money. Why does it need the 0? How many dimes make a dollar?
- 2 Teach** (10 min) Make a receipt: notebook \$3.29, pens \$5.48. Line up the points and add: the total is \$8.77. Pay with \$10: $\$10.00 - \$8.77 = \$1.23$, trading across the zeros. Check by counting up: 3 pennies make \$8.80, 2 dimes \$9.00, a dollar \$10.00. Then a soccer set is \$9.55, or the ball \$6.24 and the cones \$3.17 alone. Alone they cost \$9.41, less than the set, so buying them alone is the better buy, by \$0.14.
Say: "For change, I subtract the total from what I paid, then count up from the total to check."
- 3 Try it together** (10 min) Pairs buy two things from a price list with a \$20 bill, find the total and the change, and check with play money. Then they find the better buy: a pencil set for \$4.25, or pencils for \$2.69 and erasers for \$1.48 alone.
- 4 Practice** (15 min) Students find totals, finish the receipts, find change from a bill and circle the better buys on sheet 3 of Adding and Subtracting Decimals. Sheets 2 and 5 of Making Change review counting up and change stories. Early finishers spend as close to \$15 as they can on three things from a price list.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 2.4** and circle a face beside the "I can" line. On question 1, look for \$10.34 and \$9.66; \$9.34 means a regrouped one was not added, and \$10.66 means the dollar traded across the zeros of \$20.00 was not taken away; count up to check. On question 2, look for \$8.60 and the kit circled; glue and paper circled means the two prices were not added first.

Ready for more? With \$20.00, can you buy things for \$7.65, \$6.48 and \$5.79? What is the change?

ON ANIMAL MATH

PRINTABLE

Adding and Subtracting Decimals: sheet 3

PRINTABLE

Making Change: sheets 2 and 5, for review

TOOL

Money: Coins and Bills, then Line Up and Count

QUIZ

Decimals Quiz: the Money level

EXIT TICKET

5th Grade Adding and Subtracting Decimals Exit Tickets: Exit Ticket 2.4

GET READY

- Play money: bills, dimes and pennies for each pair
- Price tags and blank receipts

WORDS TO USE

total: the sum of all the prices

change: the money you get back when you pay more than the total

better buy: the choice that costs less for the same things

ASK

- What did you pay, and what was the total?
- How can you check your change?
- What do the parts cost together?

WATCH FOR

Lines up \$5 + \$2.48 on the right: \$2.53. Write \$5 as \$5.00 and line up the points.

Picks the cheaper single thing as the better buy. Compare the same things: the set against the parts added together.

Need help? Use play money: lay out the prices, then make change by counting up from the total.

Add and Subtract Decimals

Lesson 2.5: Decimal story problems

GOAL Students solve one- and two-step stories that add and subtract decimals: they decide what to find first, write an equation for each step, estimate, and give the answer with its unit.

About 45 minutes

I can solve decimal stories.

THE LESSON

- 1 Warm up** (5 min) Read a story without its question: Lee walked 1.4 km to school and 0.9 km to the park. Pairs write two questions it could ask.
- 2 Teach** (10 min) One step: a sunflower was 1.46 m tall in July and 2.3 m tall in August. How much did it grow? A difference: $2.3 - 1.46$. Estimate $2 - 1 = 1$, then write 2.30 and subtract: 0.84 m. Two steps: a trail is 7.5 km long. Nia hikes 2.64 km before lunch and 3.5 km after. How far is left? Step 1: $2.64 + 3.5 = 6.14$. Step 2: $7.5 - 6.14 = 1.36$ km.
Say: "First I ask what I need to find, and what I need to find first. I write an equation for each step and give the answer its unit."
- 3 Try it together** (10 min) Pairs draw a bar model and solve: a bean plant grew 0.75 cm one week and 1.4 cm the next; how much in all? Then: a 10 L bucket has 2.4 L of water in it, and Tom adds 3.15 L. How much more will fill it?
- 4 Practice** (15 min) Students solve the one-step stories, then the two-step stories, on sheet 5 of Adding and Subtracting Decimals, writing an equation for each step. Early finishers write a two-step story with the answer 1.2 kg.
- 5 Exit ticket** (5 min) Students do **Exit Ticket 2.5** and circle a face beside the "I can" line. On question 1, look for 1.95 L; 3.57 means 1.8 was lined up under the hundredths. On question 2, look for \$9.34, then \$2.66; \$9.34 alone means the second step was left out, and \$5.15 or \$9.51 means only one price was taken away.

Need help? Draw a bar model for each story and label the parts before writing an equation.

Ready for more? Solve the trail story another way: take each part away from 7.5 in turn. Why is the answer the same?

GET READY

- Story cards with decimal lengths, weights and prices
- Grid paper for lining up the points

WORDS TO USE

step: one part of the work; a two-step story needs two equations

unit: what the number measures: meters, liters, dollars

bar model: bars that show the parts and the whole of a story

ASK

- What does the question ask you to find?
- What do you need to find first?
- Does your answer make sense, and what is its unit?

WATCH FOR

Adds every number in the story. Ask what is happening: put together, take away or compare? Draw a bar model.

Stops after the first step. Reread the question: does your number answer it?

Leaves off the unit. Say the answer as a sentence: 1.36 km of the trail is left.

ON ANIMAL MATH

PRINTABLE

Adding and Subtracting Decimals: sheet 5

EXIT TICKET

5th Grade Adding and Subtracting Decimals Exit Tickets: Exit Ticket 2.5