

Reading and Writing Decimals

Reporting Category	Number and Number Sense
Topic	Reading, writing, representing, and identifying decimals
Primary SOL	4.3 The student will a) read, write, represent, and identify decimals expressed through thousandths.
Related SOL	4.3b, d

Materials

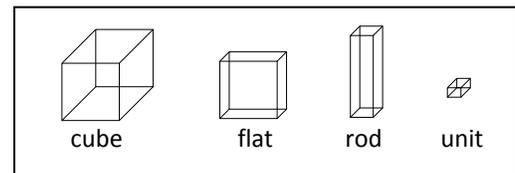
- Base-10 blocks (large cube, flats, rods, units)
- Decimal Grids (attached)
- Crayons
- Place-value charts
- Meter stick
- Index cards
- Calculator

Vocabulary

decimal, tenth, hundredth, thousandth, whole, compare, order, place value, value, digit, leading zero, decimal point, base-ten number system, represent

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Note: It is very important for students to establish the ten-to-one relationship between tenths, hundredths, and thousandths. When using base-ten blocks to model decimals, you must first identify the base-ten block that will represent the whole or 1. Repeatedly changing the type of block representing the whole helps students build an understanding of decimals and how they are part of the whole or part of 1. With this strategy, students must identify the relationships among the large cube, flat, rod, and unit.



Before undertaking this activity, create a set of 11 cards for each student: 10 cards with the digits 0–9 written on them and one card with a decimal point on it.

1. Use base-10 blocks to review the ten-to-one relationship of whole numbers. After you are certain that students are comfortable reading and representing whole numbers with base-10 blocks, ask them what is to the right of the ones place. This is a new concept for fourth graders. Relate decimals to money (\$0.25 is less than \$1.00) and fractions (part of a whole or less than one).
2. Give students a decimal number, identify the base-ten block that will represent the whole or 1, and ask them how they can model the given number with blocks. Focus students again on the ten-to-one relationship of the base-10 system. Ask, “The large cube can be broken into how many flats?” (10) “The flat can be broken into how many rods?” (10) “The rod can be broken into how many units?” (10) Make a key for student reference to show

which base-ten blocks are representing the tenth, hundredth, and thousandth. It is also helpful to display this on a place-value chart.

3. Distribute base-ten blocks. Leave the place-value chart and the base-10 blocks model on display as students create their own decimal numbers with their blocks. Encourage students to include some numbers greater than one if there are enough blocks available. Then, have students read aloud and write for the class the decimal numbers they created. Ask them to justify how they know their block models are correct.
4. After students become comfortable modeling decimal numbers and explaining why their models are correct, challenge them to model some decimal numbers as you describe them. For example, say, “I am thinking of a number greater than 5 that has a 6 in the tenths place.” Focus on the value of the number so students know where each digit belongs. (Of course, such descriptions may yield more than one correct decimal number.) You might also have students create their own numbers and descriptive clues for other students to model.
5. Distribute copies of the Decimal Grids, and repeat the same activities with students coloring the specified decimal number on the grids and recording the number. Also, you might have students read and write down a number you have colored in on a grid. You can also use these decimal grids for comparing and rounding decimals. Continue to model decimal numbers with base-ten blocks through thousandths, remembering to change the value of the whole. Students should also practice writing the decimals in word form as well as standard form, so once they have modeled a decimal number with base-ten blocks, have them write the decimals in word form as well as standard form.

Assessment

- **Questions**
 - How are decimal numbers and whole numbers alike? How are they different?
 - How can zeros affect the value of a decimal number?
 - Which is larger, 0.065 or 0.65? How do you know?
- **Journal/Writing Prompts**
 - Your teacher will give you a decimal number, and you will write about a situation in which you might use that decimal number.
- **Other**
 - Have students collect sales receipts from shopping in the community, and have them practice reading the decimal numbers on them.
 - Give students a decimal number and a key to show the type of base-ten block that represents a whole or 1. Have them model the number with the blocks.
 - Give students a Base-10 blocks model and a key, and have them write the modeled decimal number in standard form as well as word form.
 - Have students match pictures of base-ten block models of decimals with decimal numbers written in standard form as well as word form.

Extensions and Connections (for all students)

- Review the place-value chart, adding decimal places to the whole number places, and have students create their own charts.

- Provide each student with a set of 11 cards: 10 cards with the digits 0–9 on them and a decimal-point card. Repeat the earlier activity about reading and describing numbers, but this time, have students model the number both with blocks and with their digit and decimal cards. Having students read aloud the numbers they model will also give them practice in reading decimal numbers.
- Have students use the digit and decimal cards to play a Dueling Decimals Game with partners, as follows:
 - Players shuffle their digit cards and lay them in a pile face down. They keep their decimal cards face up and ready for use.
 - When both players are ready, they turn over their top four digit cards and arrange them to make a number close to the target number for that round (see target numbers below). Each player reads the number he/she created.
 - The player whose number is closer to the target number scores a point.
 - Both players return the cards to their decks and reshuffle them.
 - The first round ends when players have “dueled” five times.
 - Play for the following target numbers (or choose your own):

Round	Target Number
1	0
2	5
3	10
4	50
5	100

Strategies for Differentiation

- Have students use individual place-value mats.
- Have students use color-coding for the different places.
- Have students use individual place-value pockets with corresponding number cards.
- Have students use base-10 stamps to create numerical models.
- Have students use a math software program to practice reading decimals.
- Have students use base-10 stamps to create pictorial representations of given numbers.
- Have students continue to use base-10 blocks to solve assignments.
- Have students use a paint program to color in the appropriate decimal in the decimal grids.
- Have students use a word processing program (with pull-down menus) to select the decimal represented in the thousandths decimal grid.
- Have student pairs take turns calling out decimal numbers and writing them down. (Also, have students use a word processing program to display the corresponding decimal or use their place-value charts with number cards.)
- Have students work in groups of four or five to represent numbers called out to the class. Provide each group with a set of 10 cards with the digits 0–9 on them. Group members take the called-out digits and stand in the correct order, displaying the cards, while one member represents the decimal by extending his/her fist.

Decimal Grids

Name _____ Date _____

FLAT

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RODS

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