Teachers Guide

GRADE 3 – UNIT 3 – MODULE 3

BRIDGES®
IN MATHEMATICS

Module 3

Introducing Decimals

Teacher Masters

Pages renumber with each module.

Student Book Pages

Page numbers correspond to those in the consumable books.

Home Connections Pages

Page numbers correspond to those in the consumable books.

Module 3

Introducing Decimals

Overview

In this module, the base ten mat is assigned a value of 1. Students determine that the strip and the unit are worth 1/10 and 1/100 respectively, and are introduced to the decimal notation for these fractions. The base ten pieces serve as a visual anchor as students compare decimal numbers and investigate the relationship between tenths and hundredths. During the last two sessions, the teacher introduces two new Work Places to provide practice with adding tenths and hundredths, as well as building and comparing fractions. There is a checkpoint on fractions and decimals at the end of the module.

Planner

Session & Work Places Introduced	PI	PS	MF	WP	A	HC	DP
Session 1 Introducing Decimal Numbers Students compare the geoboard to the largest base ten area piece as a way to transition from fractions to decimals, and to consider the relationship between fractions and decimals. Using the piece as the whole, students identify the fractions represented by the other two base ten pieces and name them using words, decimal numbers, and fractions. Students finish the session by completing two Student Book pages that reinforce their understanding of decimal numbers.	●						●
Session 2 Comparing Decimal Numbers In today's session, students continue their work with decimals. To begin, they discuss and compare tenths and hundredths. Then they work in pairs to solve comparison problems with decimal numbers and fractions. Students express their answers in the form of inequalities.	●					●	●
Session 3 Thinking About Tenths & Hundredths Today, students investigate the relationship between tenths and hundredths, and discover that tenths can be rewritten as hundredths, making it possible to solve such problems as 3/10 + 42/100. The teacher introduces a new Work Place to provide practice with adding tenths and hundredths. Students then spend any time remaining in the session visiting Work Places. **Introducing Work Place 3C** Four Spins to Win Players take four turns each spinning both spinners, recording the results of their spins, rewriting the first fraction as an equivalent fraction with denominator 100, adding the two fractions, writing the total as a fraction and a decimal number, and shading in one of their grids to show the total. Players use a different color to shade in their grids each time they take a turn. When both players have had four turns, each determines the total of all his spins. Then they record and compare their total to their partner's total. The player with the total closer to 3.00, either under or over, wins.	●			●			●
Session 4 Decimal More or Less This session begins with a quick checkpoint on fractions and decimals. Then the teacher introduces a new Work Place game by playing two rounds with the class. Students complete the game in pairs and then visit other Work Places. **Introducing Work Place 3D** Decimal More or Less Players roll a more/less die to determine whether they are trying to build a number that is greater than or less than their partner's. Players take three turns each using a spinner, deciding if they want the number they spun to represent ones, tenths, or hundredths on their record sheets, and building the number with base ten pieces. After each player has built a 3-digit number, they compare their numbers. Depending on what was rolled at the beginning of the game, the player with the larger or smaller decimal number wins.				●	●	●	●

PI – Problems & Investigations, **PS** – Problem String, **MF** – Math Forum, **WP** – Work Place, **A** – Assessment, **HC** – Home Connection, **DP** – Daily Practice

Materials Preparation

Each session includes a complete list of the materials you'll need to conduct the session, as well as notes about any preparation you'll need to do in advance. If you would like to prepare materials ahead of time for the entire module, you can use this to-do list.

Task		Done
Copies	Run copies of Teacher Masters T1–T7 according to the instructions at the top of each master.	
	Run a single display copy of Student Book pages 112–113 and 115–116.	
	If students do not have their own Student Books, run a class set of Student Book pages 112–121.	
	If students do not have their own Home Connections books, run a class set of the assignments for this module using pages 61–64 in the Home Connections Book.	
Work Place Preparation	Prepare the materials for Work Places 3C & 3D using the lists of materials on the Work Place Guides (Teacher Masters T2 & T6).	
Paper Cutting	Before Session 3, make a class set of 6″ × 9″ pieces of black construction paper.	

Additional Resources

Please see this module's Resources section of the Bridges Educator site for a collection of resources you can use with students to supplement your instruction.

Session 1

Introducing Decimal Numbers

Summary

Students compare the geoboard to the largest base ten area piece as a way to transition from fractions to decimals, and to consider the relationship between fractions and decimals. Using the piece as the whole, students identify the fractions represented by the other two base ten pieces and name them using words, decimal numbers, and fractions. Students finish the session by completing two Student Book pages that reinforce their understanding of decimal numbers.

Skills & Concepts

- Express a fraction with denominator 10 as an equivalent fraction with denominator 100 (4.NF.5)
- Convert a decimal to a fraction and vice versa (supports 4.NF)
- Write fractions with denominators 10 and 100 in decimal notation (4.NF.6)
- Represent decimal numbers with digits to the hundredths place using place value models, and fraction equivalents (supports 4.NF)
- Create a visual representation of a decimal number (supports 4.NF)
- Reason abstractly and quantitatively (4.MP.2)
- Use appropriate tools strategically (4.MP.5)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations Introducing Decimal Numbers in Base Ten		
SB 112–113* Decimals Are Fractions	• base ten area pieces (class set, plus 1 for display) • geoboard and geobands (1 set for display)	
Daily Practice		
SB 114 Money, Decimals & Fractions		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy Instructions are located at the top of each teacher master. ** Run 1 copy of these pages for display.*

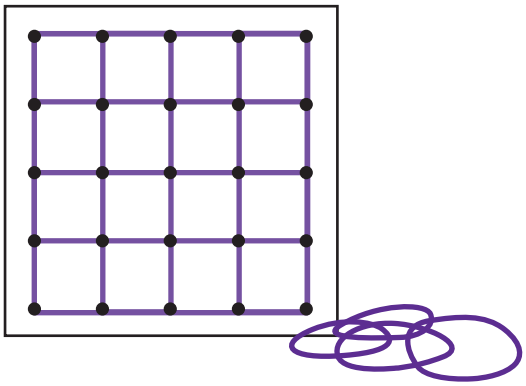
Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

decimal point
decimal number
denominator*
equivalent fractions*
fraction*
hundredth*
tenth*

Preparation

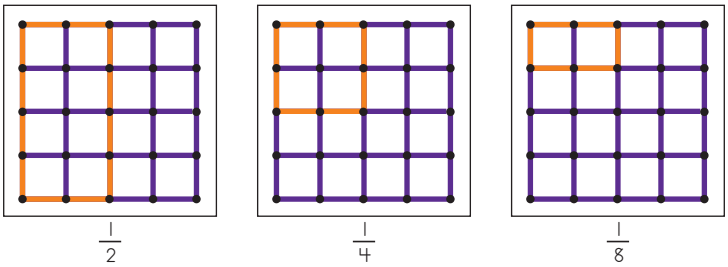
Use bands to divide a geoboard into 16 small squares.



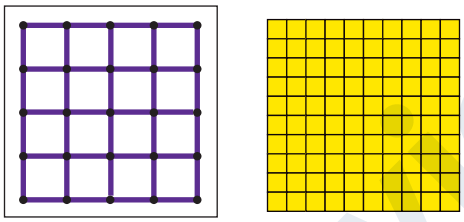
Problems & Investigations

1 Display a geoboard divided with geobands into 16 small squares, and ask students to identify what fraction is represented by each small square.

2 Then outline ½, ¼, and ⅛ one at a time on the geoboard with another band, and ask students to name the fraction represented by each.



3 Now display the geoboard divided into sixteenths and the one of your base ten mats side-by-side. Ask students to think silently and then talk in pairs about how these models are similar and how they are different.



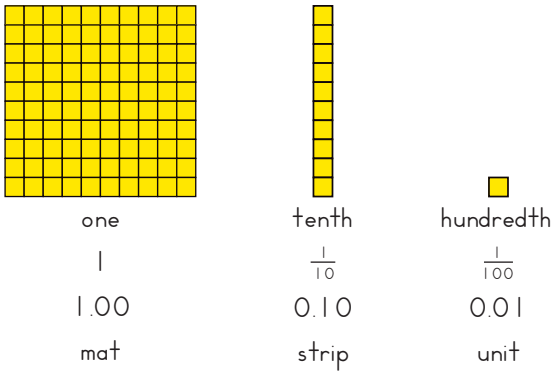
4 Ask a few pairs to share some of the similarities, and then some of the differences, they discussed.

> ***Students*** *They're both squares.*
>
> *They're both divided up into lots of other littler squares.*
>
> *They're both grids.*
>
> *The geoboard is 1, but the base ten mat is 100.*
>
> *The geoboard has 16 little squares, but the base ten mat has 100.*

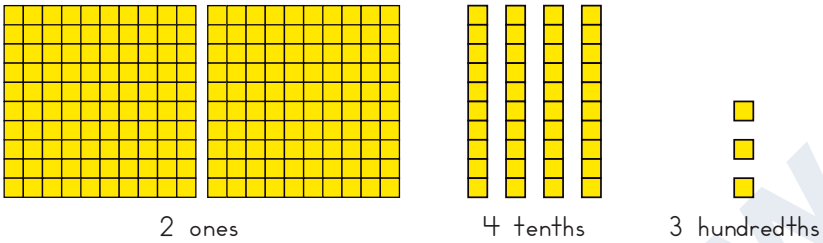
5 Ask students to get out their own base ten pieces and have them work in pairs to identify what fraction each of the other two pieces represents if the mat represents 1 whole.

> ***Teacher*** *I'd like you to think of the base ten mat as 1, just like you thought about the geoboard as 1. In today's work, this is our whole—our unit. If the mat is worth 1, talk to your partner about what fractions the strip and unit are. Use your pieces to explain your thinking to each other.*

6 Reconvene and establish the value of each piece: 1, 1/10, and 1/100. Then review how they are written with words, fractions, and decimal numbers.



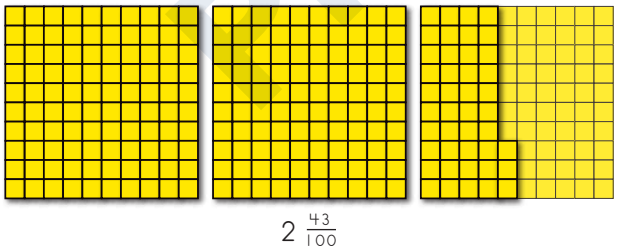
7 Now, display a collection of 2 mats, 4 strips, and 3 units and label it while students build the same collection.



8 Ask students to talk in pairs about what the total value of this collection of pieces is. Then invite several pairs to explain their ideas, using the pieces you have on display.

Students are likely to suggest the following ideas: 2 and 43 hundredths, 2 + 43/100, 2 wholes + 4 tenths + 3 hundredths, 243/100, 243.

> ***Rosa*** *We knew the 2 mats were just 2. Then we put the 4 strips and the 3 units on another mat to see what fraction they make. They covered 43 out of 100 squares, so it's 2 and 43 hundredths.*



> ***Sean*** *Or you could look at them all like they're hundredths, and it's 243 hundredths.*

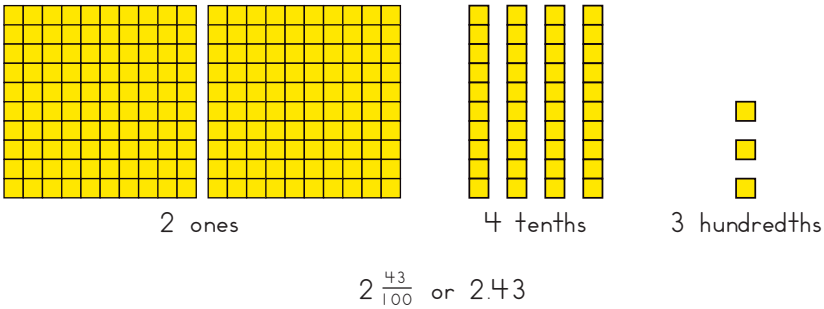
9 If no one suggests it, ask students how they could write the value of the collection without using fractions. (If they have trouble, you might invite them think about how they would write 2 dollars and 43 cents.)

10 Explain that 2.43 is read "two and forty-three hundredths." Comment that students will often hear 2.43 read as "two point four three" and explain that the point refers to the decimal point.

Throughout your work with decimals, encourage students to read decimal numbers as a whole number and a decimal fraction (e.g., "two and forty-three hundredths").

Some students may be surprised that the way you read a decimal sounds just like a fraction or mixed number. If students comment on this, take advantage of this opportunity to connect fractions and decimals.

> ***Teacher*** *You read the number as "two and forty-three hundredths," whether it is written as a fraction or a decimal. That's because the decimal and the fraction have the same value. They are equivalent. We can label the collection either 2.43 or 2 $^{43}/_{100}$.*



11 Help students practice reading and writing a few decimal numbers.

- Write 3.56 and 7.42 and ask students to turn to a partner and read these numbers aloud.
- Then, write each number in words: three and fifty-six hundredths; seven and forty-two hundredths.
- Ask students what they notice about the way these decimal numbers are written in words.
- Emphasize the "th" at the end of hundredths.
- Write *one and twenty-seven hundredths, two and six hundredths*, and *four and three tenths* and ask students how to write these numbers as decimals.

12 Display 2 strips and have students build the same collection. Then have students think quietly about, then share in pairs, the different ways of expressing the value of the collection.

- Ask students the following questions.
  - » What is the value of this collection? (0.2 or 2 tenths)
  - » How many different ways can you write or say the value of this collection? How can you use what you know about fractions to help you? (2 tenths, 20 hundredths, 0.2, 0.20)
- Record students' responses where everyone can see.
- If nobody mentions it, explain that this collection can also be written $^{1}/_{10} + {}^{1}/_{10}$ or $^{10}/_{100} + {}^{10}/_{100}$.

13 Discuss the equivalence of tenths and hundredths expressed in decimal notation and as fractions.

- Write the following numbers: 0.3, 0.30, $^{3}/_{10}$, and $^{30}/_{100}$.
  - » Ask students if these numbers are equivalent or if some of them are greater than or less than others.
  - » Encourage students to use base ten area pieces to support their thinking. Then, invite a few students to share.
- Write the following numbers: $^{8}/_{10}$, $^{80}/_{100}$, 0.8, and 0.80.
  - » Ask students how many hundredths are in $^{8}/_{10}$.
  - » Use one of the mats to show $^{8}/_{10}$ is equal to $^{80}/_{100}$, and model how to write $^{8}/_{10} = {}^{80}/_{100}$.
  - » Ask students how to write $^{8}/_{10}$ and $^{80}/_{100}$ as decimal numbers.

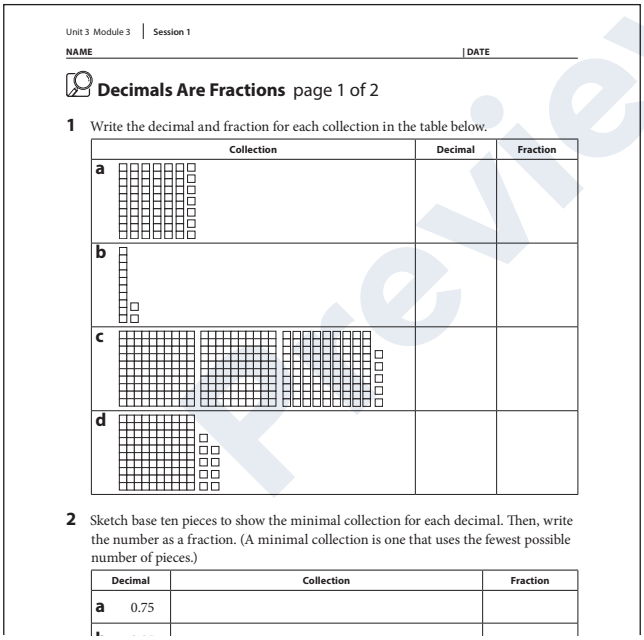
14 Have students practice modeling, writing and reading the numbers 0.59 and 1.31 as decimals and as fractions.

- Write 0.59 on the board without saying it aloud.
- Have students build the collection with their base ten pieces.
- Have students turn to a partner and decide who will go first. Tell the first person to write and say the decimal name for the collection.
- Then, tell the second person to write and say the fraction name for the collection.
- Repeat the process for 1.31, but have students switch whether they write and say the decimal or the fraction.

To help students read and write numbers, emphasize that when there is only a number in the tenths place, such as 0.7, the fraction has a 10 as the denominator. Students write and say it like it sounds: 7/10. When there are numbers in both the tenths and the hundredths place, such as 0.63, the fraction has 100 as the denominator and students write it and say it like it sounds as well: 63/100.

15 Have students turn to page 1 of the Decimals Are Fractions Student Book page while you display your copy. Read the directions aloud and then have students work independently.

Solve 1a and 2a together, if you feel it is necessary for your class.



Unit 3 Module 3 | Session 1

NAME | DATE

Decimals Are Fractions page 1 of 2

1 Write the decimal and fraction for each collection in the table below.

	Collection	Decimal	Fraction
a			
b			
c			
d			

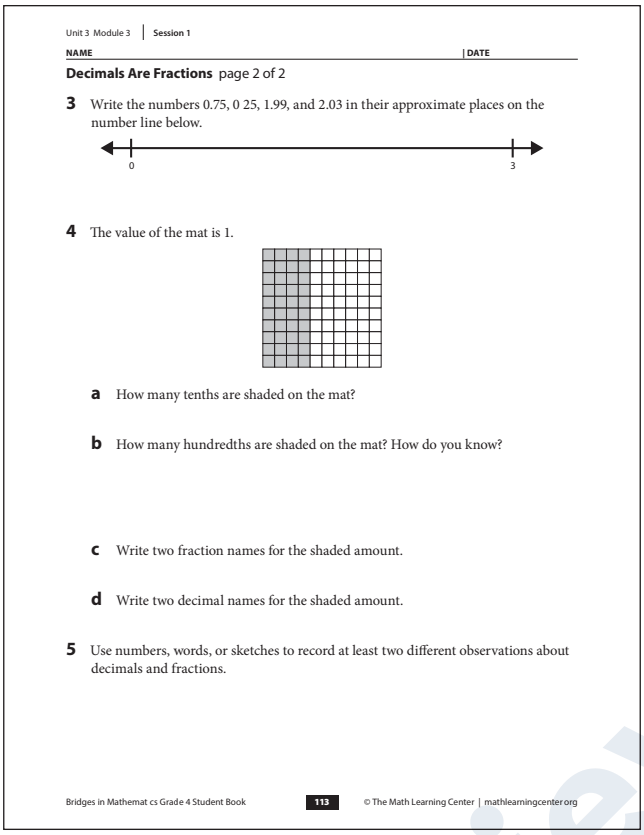
2 Sketch base ten pieces to show the minimal collection for each decimal. Then, write the number as a fraction. (A minimal collection is one that uses the fewest possible number of pieces.)

	Decimal	Collection	Fraction
a	0.75		

- As students work, walk around the room to make observations and offer support. Ask students to practice reading the fraction and decimal names aloud to you.
- When most students have finished the first page, have them share their work with a partner.

16 Display page 2 of the Decimals Are Fractions Student Book page, give students a moment to read it and ask questions, and then have them work independently or with a partner.

Remind students who choose to work with a partner to answer questions in their own Student Books.



Unit 3 Module 3 | Session 1

NAME | DATE

Decimals Are Fractions page 2 of 2

3 Write the numbers 0.75, 0 25, 1.99, and 2.03 in their approximate places on the number line below.

0 3

4 The value of the mat is 1.

a How many tenths are shaded on the mat?

b How many hundredths are shaded on the mat? How do you know?

c Write two fraction names for the shaded amount.

d Write two decimal names for the shaded amount.

5 Use numbers, words, or sketches to record at least two different observations about decimals and fractions.

Bridges in Mathemat cs Grade 4 Student Book 113 © The Math Learning Center | mathlearningcenter.org

17 When most students are finished, review the Decimals Are Fractions Student Book pages together, focusing on the more open-ended questions and the questions that seemed most puzzling for your students.

Daily Practice

The optional Money, Decimals & Fractions Student Book page provides additional opportunities to apply the following skills:

- Write fractions with denominator 10 in decimal notation (4.NF.6)
- Write fractions with denominator 100 in decimal notation (4.NF.6)
- Represent decimal numbers with digits to the hundredths place using place value models and fraction equivalents (supports 4.NF)
- Read and write decimal numbers with digits to the hundredths place (supports 4.NF)

Session 2

Comparing Decimal Numbers

Summary

In today's session, students continue their work with decimals. To begin, they discuss and compare tenths and hundredths. Then, they work in pairs to solve comparison problems with decimal numbers and fractions. Students express their answers in the form of inequalities. Finally, the teacher introduces and assigns the More Comparing Fractions & Decimals Home Connection.

Skills & Concepts

- Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100 (4.NF.5)
- Write fractions with denominators 10 or 100 in decimal notation (4.NF.6)
- Convert a decimal to a fraction and vice versa, and visually represent the number (supports 4.NF)
- Compare two decimal numbers with digits to the hundredths place; use the symbols >, =, and < to record the comparison; demonstrate an understanding that the comparison is valid only when the two numbers refer to the same whole; and justify the comparison (4.NF 7)
- Construct viable arguments and critique the reasoning of others (4.MP.3)
- Model with mathematics (4.MP.4)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations Comparing Decimal Numbers		
SB 115–116* Comparing Decimals & Fractions	• base ten area pieces (1 set per student) • plastic coins (dimes and pennies, 10 of each)	
Home Connection		
HC 61–62 More Comparing Decimals & Fractions		
Daily Practice		
SB 117 Number Riddles		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy Instructions are located at the top of each teacher master. ** Run 1 copy of these pages for display.*

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

compare
decimal number
greater than
hundredths
less than
tenths

Problems & Investigations

Comparing Decimal Numbers

1 Display one of each kind of base ten piece, review how much each piece is worth (1, 1/10, and 1/100), and then make sure each student has a set of base ten pieces.

2 Next, write 0.4 and 0.04 on the board, and have students turn and talk to a partner about how each number would be read aloud.

- Invite a volunteer to read the numbers aloud. [four tenths and four hundredths]
- Have students build each number with their base ten area pieces.

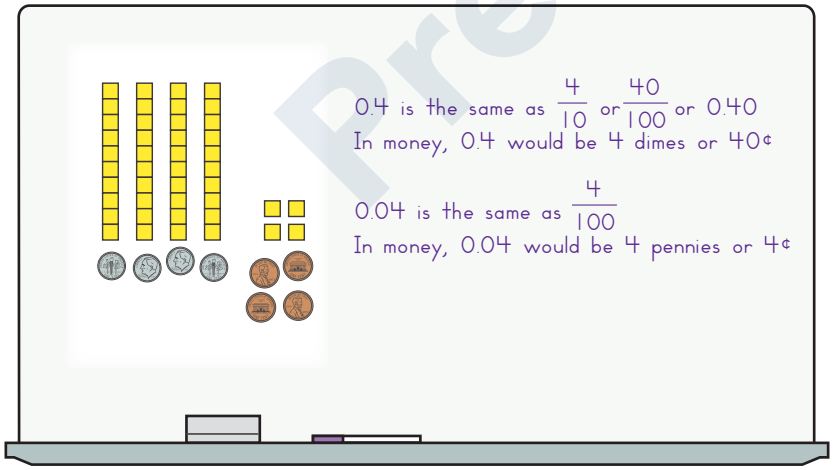
3 Invite a volunteer to build 0.4 where everyone can see. Then, ask student pairs to come up with other ways to write the value of the pieces. [0.40, 4/10, 40/100]

Record the names students propose.

4 Repeat the procedure with 0.04. [4/100]

5 Explain that a common mistake people make is to confuse tenths and hundredths. Ask students to think about how they can convince others that 0.4 has a value of four tenths and not four hundredths. Invite a few students to share their arguments.

SUPPORT If students seem perplexed by this challenge, have them re-examine and compare the representations of 0.4 and 0.04 they built with their base ten pieces. You might also work with students' input to build both quantities with coins, noting with the class that a dime is the same as one-tenth of a dollar, while a penny is the same as one-hundredth of a dollar. So, 0.4 or 4 tenths is 4 dimes or 40 cents, while 0.04 is 4 pennies—just 4 cents.



6 Repeat the challenge, but this time tell students they have to convince someone that 0.07 has a value of seven hundredths and not seven tenths.

7 Then, ask students which is greater: 0.4 or 0.07.

- Have students turn to a partner and talk about the question. Then, invite a few students to share their thinking using models.
- Make sure money amounts are mentioned and shown, if necessary, to support students' thinking.

Math Practices in Action 4.MP.4

The base ten pieces are a powerful model for decimal numbers. By using them to model different numbers and justify comparisons of those numbers, students are developing a deep understanding of decimal numbers and our base ten number system.

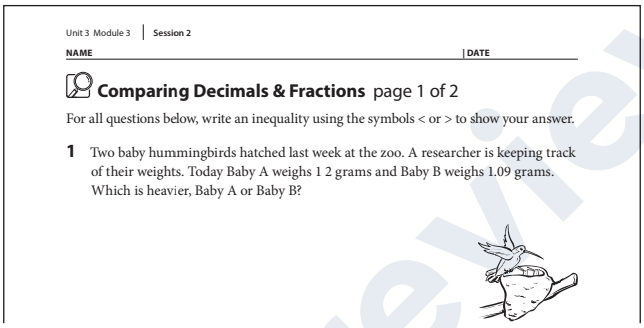
8 Write $\frac{4}{10}$ and $\frac{7}{100}$, and ask students if they can think of an easy way to add $\frac{4}{10}$ and $\frac{7}{100}$.

Have students turn to a partner and to discuss the question. Then, invite a few students to share their thinking.

> ***Tanner*** *I pictured 4 tenths and 7 hundredths. I put them together and I got 47 hundredths.*
>
> ***Elysa*** *I did that, too, but then I thought about what it would be as a fraction. If I covered a mat with 47 of those little squares, it would show 47 out of 100 covered, so it's* $\frac{47}{100}$.
>
> ***Chin*** *I know that 4 tenths is equal to 40 hundredths. Forty hundredths and 7 hundredths are 47 hundredths. Then, I did it like you and got* $\frac{47}{100}$.
>
> ***Maria*** *It's like finding out how much money you have. You have 4 dimes and 7 pennies. That's 47 cents, so 47 out of 100,* $\frac{47}{100}$.

9 Introduce the Comparing Decimals & Fractions Student Book pages, and complete the first problem together.

- Display the first page of Comparing Decimals & Fractions. Have students open their Student Books to the same page.



Unit 3 Module 3 | Session 2

NAME | DATE

Comparing Decimals & Fractions page 1 of 2

For all questions below, write an inequality using the symbols < or > to show your answer.

1 Two baby hummingbirds hatched last week at the zoo. A researcher is keeping track of their weights. Today Baby A weighs 1 2 grams and Baby B weighs 1.09 grams. Which is heavier, Baby A or Baby B?

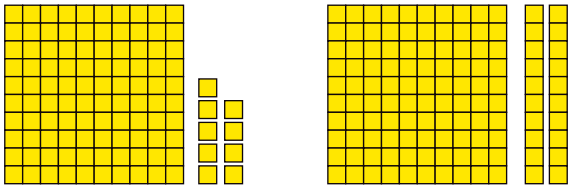
- Read the first problem aloud, and remind students that a paperclip weighs about a gram.
- Ask students to turn to a partner and talk about which weighs more, baby A at 1.2 grams or baby B at 1.09 grams. Tell students to record their thinking on the page.

Don't be surprised if students suggest that baby B weighs more. Some students will reason that 9 is more than 2, so 1.09 is greater than 1.2.

SUPPORT Have the students to build both numbers with their base ten area pieces.

- Invite a few students to share their thinking and model how to record the relationship between the weights as an inequality.

> ***Will*** *We built both numbers. Here's what they looked like with base ten area pieces. We thought baby B would be heavier because 9 is more than 2, but when we built it we saw that B was 9 hundredths and A was 2 tenths. So, baby A weighed more.*



1.09 Baby B 1.2 Baby A

Teacher *The directions ask you to record your answers as inequalities. An inequality uses the greater than or less than sign to show which number is greater and which is less. What are two ways you could record the relationship between the baby hummingbirds' weights as an inequality?*

Justin *You can write 1.09 is less than 1.2 or 1.2 is greater than 1.09.*

Teacher (Writes *1.09 < 1.2* and *1.2 > 1.09* on the display copy.)

10 Have students work in pairs to complete both pages of Comparing Decimals & Fractions.

If students need a referent for problem 3, mention that a packet of hot chocolate weighs about an ounce.

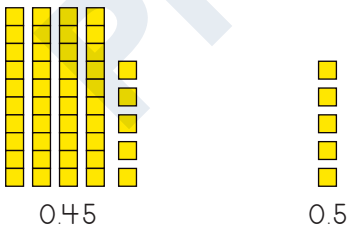
ELL Because these pages require a lot of reading, try to pair ELL students with peers who can translate, or let ELL students' partners know they should take time to explain the problems, even if they don't have time to complete both pages.

CHALLENGE Consider pairing students you think will complete this task easily. Ask these students to find the exact difference between numbers instead of just comparing them. Remind students to use base ten area pieces if necessary.

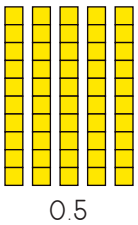
- As students work, circulate around the room to make observations and offer support.
- If a particular problem seems challenging to many students, reconvene the class for a few minutes and discuss it with the group.

Teacher *I noticed that many of you were puzzling over the last question, which asks you to show a number between 0.5 and 0.45. Student A, will you come up and use the base ten area pieces to explain the disagreement you had with your partner?*

June *I think the number has to be between these two numbers. Here are point-four-five and point-five. My partner thinks that's wrong, though. She says the point-four-five part is right, but the point-five should be like a half.*



Austin *Right. I think point-five looks like this. Because it's five-tenths, not five-hundredths like the one she built.*



Teacher *Please take a moment to talk about this with your neighbor.… What did you conclude?*

Nick *We think it's 5/10 because the 5 is just right next to the decimal point in the tenths place.*

11 Close the lesson by letting students know they will continue working with decimals in the next few sessions and then giving them a few minutes to put away materials.

Home Connection

12 Introduce and assign the More Comparing Decimals & Fractions Home Connection, which provides more practice with the following skills:

- Represent decimal numbers with digits to the hundredths place using place value models and fraction equivalents (supports 4.NF)
- Create a visual representation of a fraction and a decimal number (supports 4.NF)
- Write fractions with denominators 10 0r 100 in decimal notation (4.NF.6)
- Compare two decimal numbers with digits to the hundredths place (4.NF.7)
- Use the symbols >, =, and < to record comparisons of two decimal numbers with digits to the hundredths place (4.NF 7)

Daily Practice

The optional Number Riddles Student Book page provides additional opportunities to apply the following skills:

- Read and write decimal numbers with digits to the hundredths place (supports 4.NF)
- Write fractions with denominator 10 or 100 in decimal notation (4.NF.6)
- Compare two decimal numbers with digits to the hundredths pace using the symbols >, =, and < to record comparisons (4.NF.7)

Session 3

Thinking About Tenths & Hundredths

Summary

Today, students investigate the relationship between tenths and hundredths and discover that tenths can be rewritten as hundredths, making it possible to solve such problems as $\frac{3}{10} + \frac{42}{100}$. The teacher introduces a new Work Place to provide practice with adding tenths and hundredths. Students then spend any time remaining in the session visiting Work Places.

Skills & Concepts

- Explain why a fraction can be decomposed into the sum of fractions with the same denominator (4.NF.3b)
- Express a fraction with denominator 10 as an equivalent fraction with denominator 100 (4.NF.5)
- Add a fraction with denominator 10 to a fraction with denominator 100 by rewriting the first fraction as an equivalent fraction with denominator 100 (4.NF.5)
- Write fractions with denominators 10 and 100 in decimal notation (4.NF.6)
- Make sense of problems and persevere in solving them (4.MP.1)
- Construct viable arguments and critique the reasoning of others (4.MP.3)

Materials

Copies	Kit Materials	Classroom Materials
Problems & Investigations Thinking About Tenths & Hundredths		
TM T1 Thinking About Tenths & Hundredths	• base ten area pieces, class set	• 6. × 9. black construction paper (1 per student) • a piece of copy paper to mask portions of the teacher master
Work Places Introducing Work Place 3C Decimal Four Spins to Win		
TM T2 Work Place Guide 3C Decimal Four Spins to Win **TM T3** 3C Decimal Four Spins to Win Record Sheet **SB 118*** Work Place Instructions 3C Decimal Four Spins to Win	• spinner overlay • base ten area pieces, class set	• colored pencils, class set
Work Places in Use		
2C Moolah on My Mind (introduced in Unit 2, Module 3, Session 4) **2D** Remainders Win (introduced in Unit 2, Module 4, Session 3) **2E** More or Less Multiplication (introduced in Unit 2, Module 4, Session 4) **3A** Dozens of Eggs (introduced Unit 2, Module 2, Session 4) **3B** Racing Fractions (introduced in Unit 3, Module 2, Session 6) **3C** Decimal Four Spins to Win (introduced in this session)		
Daily Practice		
SB 119 Tenths & Hundredths		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy Instructions are located at the top of each teacher master. ** Run 1 copy of these pages for display.*
*** Run 1 copy of this page and store it for use by the teacher and other adult helpers during Work Place time.*

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

decimal*
denominator*
equivalent fractions*
hundredths
numerator*
tenths

Preparation

- In today's session, you'll introduce Work Place 3C Decimal Four Spins to Win, which replaces Work Place 2B Division Capture. Before this session, you should review the Work Place Guide, as well as the Work Place Instructions. Make copies of the 3C Decimal Four Spins to Win Record Sheet for use today and store the rest in the Work Place 3C Decimal Four Spins to Win tray, along with the materials listed on the guide. The Work Place Guide also includes suggestions for differentiating the game to meet students' needs.
- Write the list of Work Places from which students can choose today. You can just write the numbers (2C–3C) or write out the full names if you prefer. (See the list in the Work Places in Use row of the Materials Chart for the complete list of Work Places used today.)

Problems & Investigations

Thinking About Tenths & Hundredths

1 Set the stage for today's activities.

- Let students know that they're going to do some more thinking about tenths and hundredths today, first solving some problems together, then learning a new Work Place game. Once they know how to play the new game, they'll spend the rest of the session visiting Work Places.
- Give each student a set of base ten area pieces and a half-sheet of black construction paper.

2 Display the top portion of the Thinking About Tenths & Hundredths Teacher Master, keeping the rest covered for now.

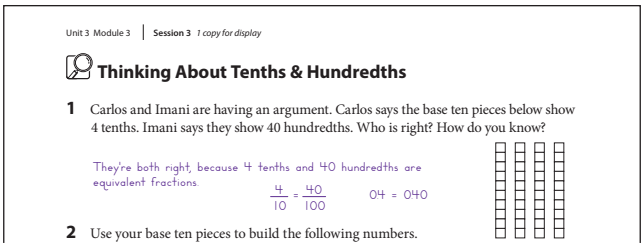
Give students a minute to read the problem to themselves and think about it privately.

SUPPORT Ask students to use their base ten pieces to build the collection shown on the teacher master so they can examine it very closely.

3 Ask students to share their thoughts about the situation, first in pairs and then as a whole class.

During the discussion, draw out the idea that $\frac{4}{10}$ and $\frac{40}{100}$ are *equivalent fractions*. Work with input from the students to record equations in both fraction and decimal form to express this fact.

> ***Students*** *I think Carlos is right. We said that the strips were tenths, and there are 4 of them. It's 4 tenths.*
>
> *But each of the strips is divided into 10 little squares, and we said the little squares were hundredths, so you could say it's 40 hundredths.*
>
> *I think they're both right, and they should stop arguing.*
>
> ***Teacher*** *How are you thinking about that, Monica? How can that collection of base ten pieces be two different things at once?*
>
> ***Monica*** *Well, it's kind of like if you had 4 dimes, right? You could say you had 4 dimes, but you could also say that you had 40 cents, which is the same as 40 pennies. I think it's the same with the base ten pieces.*
>
> ***Teacher*** *What do the rest of you think about that?*
>
> ***Brian*** *Well, it's not that they're exactly the same, but they're equal. Four tenths and forty hundredths are equal. It just depends on whether you look at the strips or the little squares on the strips.*
>
> ***Keiko*** *They're equivalent! $\frac{4}{10}$ and $\frac{40}{100}$ are just different ways to talk about the same amount.*


Unit 3 Module 3 | **Session 3** *1 copy for display*

Thinking About Tenths & Hundredths

1 Carlos and Imani are having an argument. Carlos says the base ten pieces below show 4 tenths. Imani says they show 40 hundredths. Who is right? How do you know?

They're both right, because 4 tenths and 40 hundredths are equivalent fractions. $\frac{4}{10} = \frac{40}{100}$ 04 = 040

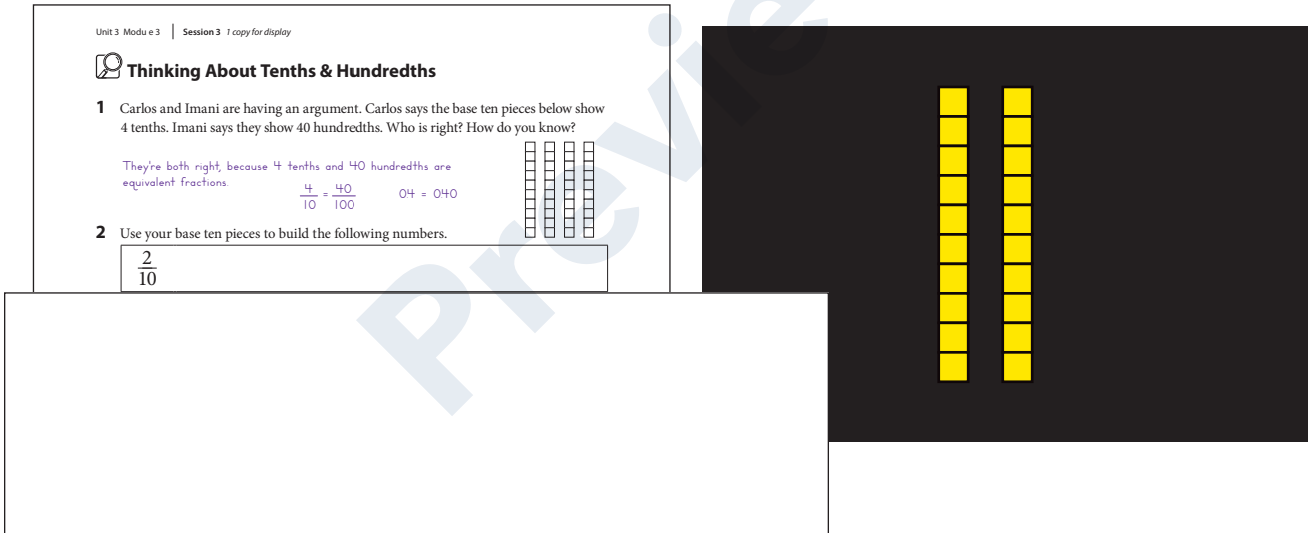
2 Use your base ten pieces to build the following numbers.

4 Now explain that you're going to show students some fractions and have them build each with their base ten pieces.

- Have them organize their base ten pieces, making neat piles of mats, strips, and units.
- Remind them that the mat has a value of 1, and review the fact that each strip represents a tenth and each unit represents a hundredth.
- Ask them to set the half-sheet of black construction paper directly in front of themselves, like a small place mat. Explain that each time you show a fraction, they're to read it to themselves, and set out that amount on their place mat as efficiently as possible.

5 Reveal the first fraction in the table on the lower part of the teacher master, keeping the rest covered for now.

After students have built the fraction on their place mats, ask a volunteer to share and explain her response.


Unit 3 Modu e 3 | **Session 3** *1 copy for display*

Thinking About Tenths & Hundredths

1 Carlos and Imani are having an argument. Carlos says the base ten pieces below show 4 tenths. Imani says they show 40 hundredths. Who is right? How do you know?

They're both right, because 4 tenths and 40 hundredths are equivalent fractions. $\frac{4}{10} = \frac{40}{100}$ 04 = 040

2 Use your base ten pieces to build the following numbers.

$\frac{2}{10}$

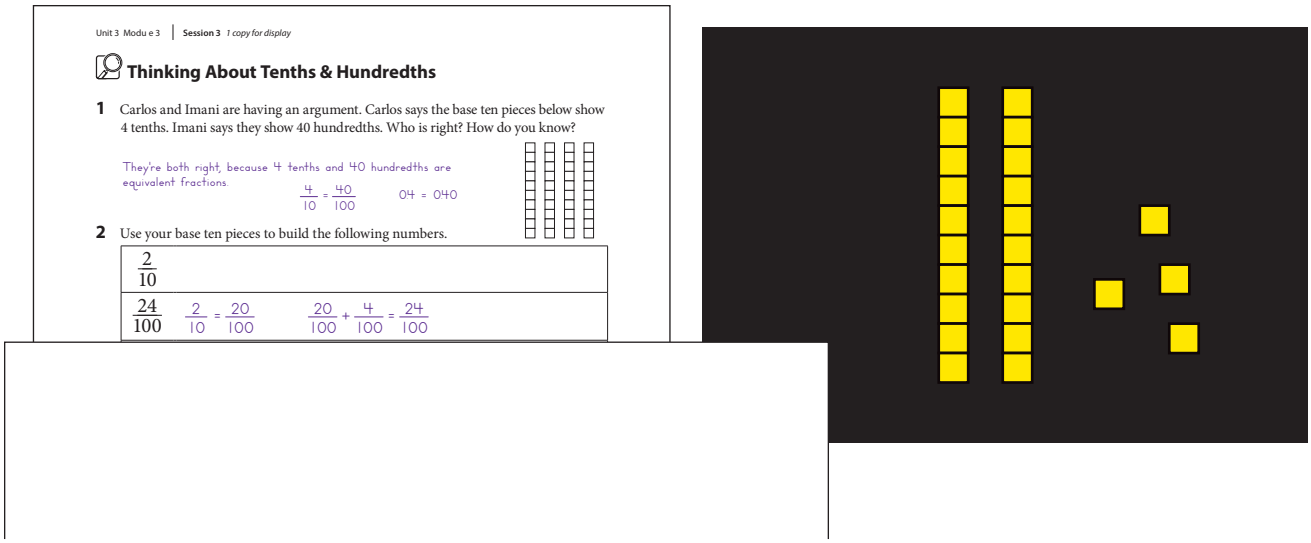
Maritza *It says two tenths, so I just put out 2 strips; one-tenth plus one-tenth.*

6 Reveal the second fraction in the table, and give students a moment to read and build it.

- Watch the students carefully to see who completes the task very quickly and who clears their mat and starts over.
- Then call on a student who performed the task without starting over, and ask him to explain how he built the fraction so quickly.
- Record an equation on the teacher master to represent his explanation.

Teacher *Tyrell, I noticed that you built that fraction quick as a wink! How did you do it so fast?*

Tyrell *Well, it said 24 hundredths, right? I know that 2 tenths is the same as 20 hundredths, so I just added 4 more hundredths.*



Unit 3 Modu e 3 | Session 3 *1 copy for display*

Thinking About Tenths & Hundredths

1 Carlos and Imani are having an argument. Carlos says the base ten pieces below show 4 tenths. Imani says they show 40 hundredths. Who is right? How do you know?

They're both right, because 4 tenths and 40 hundredths are equivalent fractions. $\frac{4}{10} = \frac{40}{100}$ 04 = 040

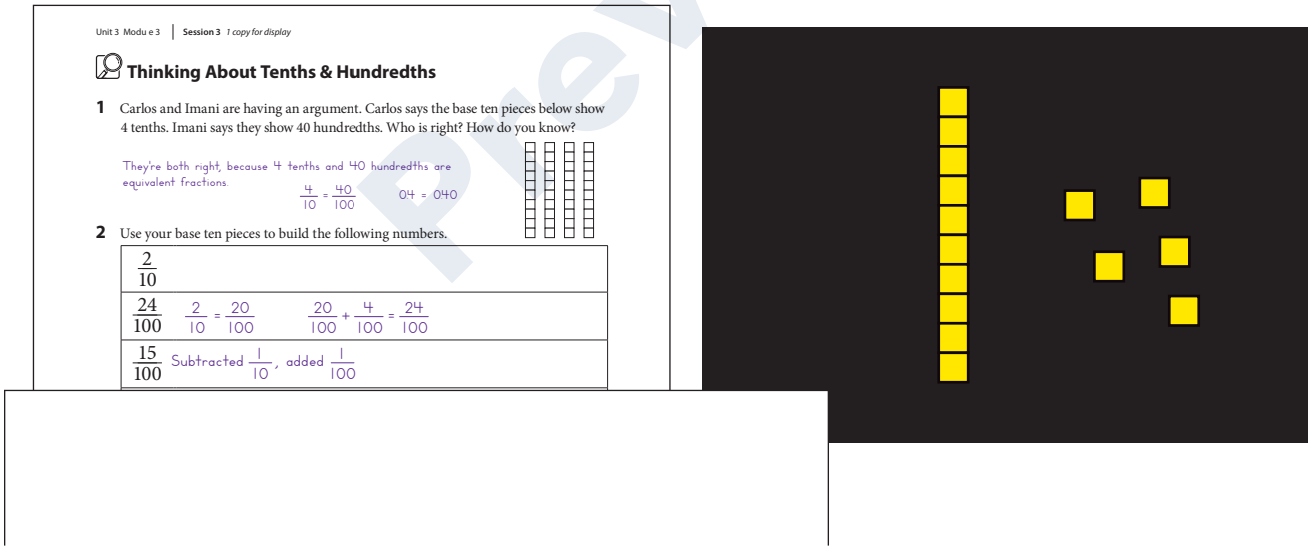
2 Use your base ten pieces to build the following numbers.

$\frac{2}{10}$	
$\frac{24}{100}$	$\frac{2}{10} = \frac{20}{100}$ $\frac{20}{100} + \frac{4}{100} = \frac{24}{100}$

7 Challenge all of the students to build the fraction you're about to show next without clearing their mats and starting over.

- Reveal the next fraction on the list.
- Watch again for students who are using very efficient strategies to shift the quantity on their mats.
- Call on one of these students to explain how she worked with her base ten pieces to show the new quantity so quickly. Record her explanation on the master.

> ***Ebony*** *OK, I just took off a strip and added a little square to change 24/100 into 15/100.*



Unit 3 Modu e 3 | Session 3 *1 copy for display*

Thinking About Tenths & Hundredths

1 Carlos and Imani are having an argument. Carlos says the base ten pieces below show 4 tenths. Imani says they show 40 hundredths. Who is right? How do you know?

They're both right, because 4 tenths and 40 hundredths are equivalent fractions. $\frac{4}{10} = \frac{40}{100}$ 04 = 040

2 Use your base ten pieces to build the following numbers.

$\frac{2}{10}$	
$\frac{24}{100}$	$\frac{2}{10} = \frac{20}{100}$ $\frac{20}{100} + \frac{4}{100} = \frac{24}{100}$
$\frac{15}{100}$	Subtracted $\frac{1}{10}$, added $\frac{1}{100}$

8 Reveal the rest of the fractions on the master, one by one.

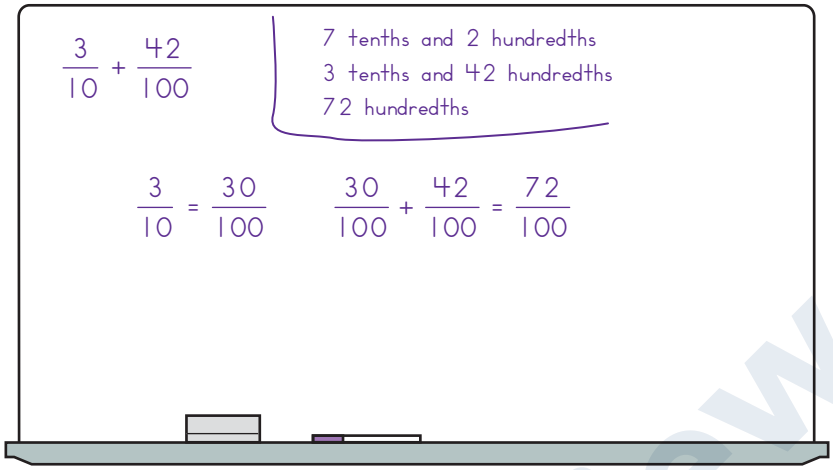
- As you reveal each, have students change the quantity on their place mat as quickly as possible to reflect the new amount.
- Each time, call on one student who has performed the task with efficiency to explain how he or she made the change from the previous quantity to the new one.
- Move briskly through the list, without stopping to record students' explanations.

SUPPORT If more than a few of your students struggled to transition from one fraction to the next efficiently, go through the list a second time, starting with the third fraction, and take time to solicit and record students' explanations.

9 Conclude this part of the session by writing the following equation on the board and asking students to model and solve it with their base ten pieces.

$$\frac{3}{10} + \frac{42}{100}$$

- Solicit and record students' answer(s) on the board.
- Invite several volunteers to share and explain their thinking.
- Reinforce the fact that one has to think of the tenths as hundredths in order to add the two quantities and report the total in a sensible way. Work with students to record an equation on the board reflecting this idea.



Work Places

Introducing Work Place 3C Decimal Four Spins to Win

10 Display a copy of the 3C Decimal Four Spins to Win Record Sheet. Tell students they are going to learn a new Work Place that will give them more practice adding tenths and hundredths.

Ask students to keep their base ten pieces and get out their colored pencils or crayons.

11 Briefly summarize the game before playing against the class.

Players spin the hundredths spinner on the record sheet; the player who spins the greater fraction goes first. Players take four turns each spinning both spinners, recording the results of their spins, rewriting the first fraction as an equivalent fraction with denominator 100, adding the two fractions, writing the total as a fraction and a decimal number, and shading in one of their grids to show the total. Players must be sure to use a different color to shade in their grids each time they take a turn. When both players have had four turns, each player determines the total of all his or her spins. Then they record and compare their total to their partner's total. The player with the total closer to 3.00, either under or over, wins.

12 Give students each a copy of the 3C Decimal Four Spins to Win Record Sheet. Play a full game with the class, students working as a team against you. Use your copy of the instructions from the Student Book as needed.

- Take the first turn so you can model the steps carefully and thoroughly.
- Invite a student to bring her record sheet up for display and take a turn for the class. Have the other students record the results on their copies of the sheet.

- Continue to take turns with the class until you and the students have each had four turns. Remind students to use a different color to shade in their grids each turn.
- Each time it's the students' turn, invite a different student to bring his or her record sheet up for display and lead the rest of the students.

13 Pose questions like the following to promote discussion of skills and concepts related to decimals and fractions while you play:

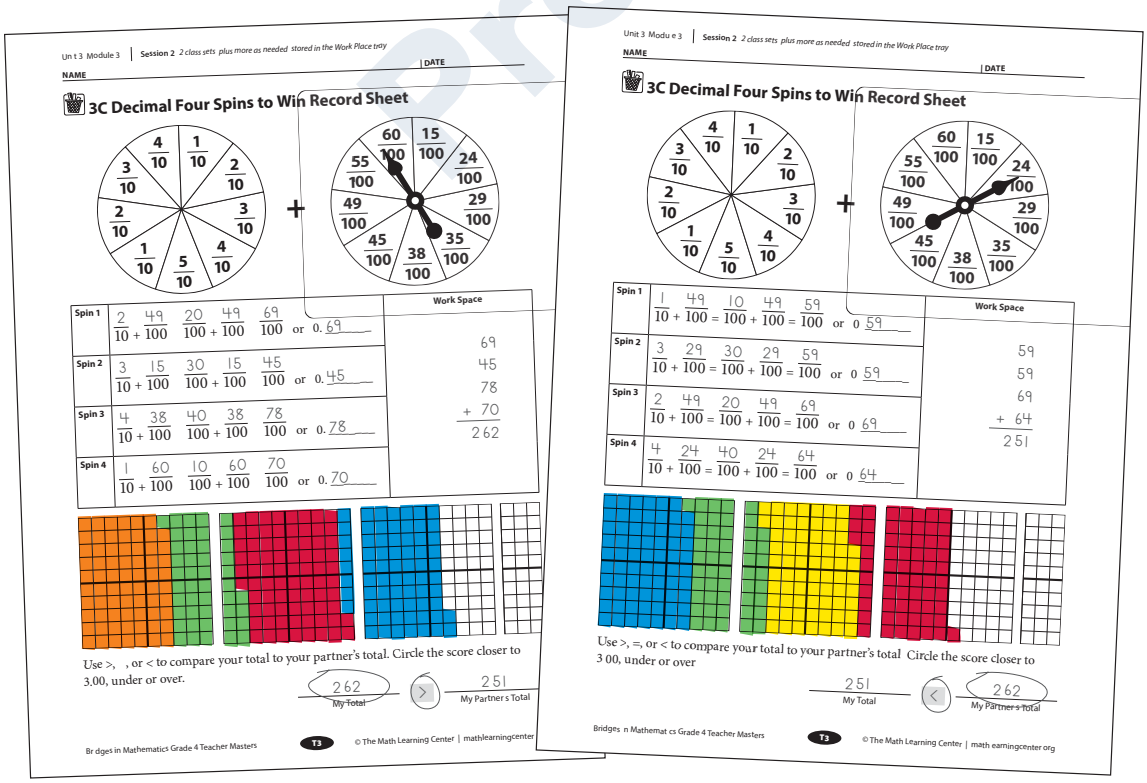
- What is my score so far? What is yours?
- Which team is ahead? By how much?
- How many more hundredths do you need to fill your first (second, third) grid?
- I just spun 3 tenths and 29 hundredths. Can you add those two fractions in your head? Show thumbs up when you have the answer.
- How much is each grid worth in this game?
- Why do we have to rewrite the tenths as hundredths? Why can't we just leave them as tenths?

14 When each team has had four turns, work with input from the students to determine your total.

- Have them examine the grids you've shaded in on your record sheet carefully, and work in pairs to determine your total.
- Solicit and record their answer(s).
- Use the work space on your sheet to add the results of your four turns as a way to double-check the total shown on the grids.

15 Work with the class to determine which team won the game.

- Give students a minute to determine their total.
- Then compare the teams' scores in the space provided at the bottom of the record sheet, as students do the same on their sheets.
- Decide with the students which total is closer to 3.00, either under or over.



Students *Mr. Fernandez won. He got 2.62, and we only got 2.51.*
He didn't win by much—only by a tenth and then one more hundredth.
That's 11 hundredths!
It's still not very much.

16 Ask students to find the Work Place Instructions 3C Decimal Four Spins to Win Student Book page and read the directions with a partner.

Ask if they have any questions about how to play the game.

Work Places

17 When students indicate that they understand how to play the new game, have them pick up their folders and choose one of the available Work Places.

- Remind students to fill out their Work Place Logs as they finish each game or activity.
- Encourage students to choose Work Places that will help them with skills and concepts that have been challenging for them in this unit.

SUPPORT Suggest specific Work Places for struggling students to work on critical skills.

CHALLENGE Encourage students to think about the strategies they use and share their thinking. Encourage students to generalize what happens in certain Work Places.

18 Circulate as students are working to observe and take notes, or pull small groups to help students who need support before the post-assessment coming up at the end of the unit. Use the Work Place Guides to find suggestions for differentiated instruction.

19 Close the session.

- Have students put away their materials.

Daily Practice

The optional Tenths & Hundredths Student Book page provides additional opportunities to apply the following skills:

- Express a fraction with denominator 10 as an equivalent fraction with denominator 100 (4.NF.5)
- Add a fraction with denominator 10 to a fraction with denominator 100 by rewriting the first fraction as an equivalent fraction with denominator 100 (4.NF.5)
- Write fractions with denominator 10 or 100 in decimal notation (4.NF.6)

Session 4

Decimal More or Less

Summary

This session begins with a quick checkpoint on fractions and decimals. Then the teacher introduces a new Work Place game by playing two rounds with the class. Students complete the game in pairs, and then visit other Work Places. Finally, the teacher introduces and assigns the Decimals, Fractions & Story Problems Home Connection.

Skills & Concepts

- Use visual models to generate and recognize equivalent fractions (4.NF.1)
- Compare two fractions with different numerators and different denominators using the symbols >, =, and <; explain why one fraction must be greater than or less than another fraction (4.NF.2)
- Solve story problems involving addition and subtraction of fractions referring to the same whole and with like denominators (4.NF.3d)
- Express a fraction with denominator 10 as an equivalent fraction with denominator 100 (4.NF.5)
- Read and write decimal numbers with digits to the hundredths place (supports 4.NF)
- Represent decimal numbers with digits to the hundredths place using place value models (supports 4.NF)
- Compare two decimal numbers with digits to the hundredths place using the symbols >, =, and < (4.NF.7)
- Make sense of problems and persevere in solving them (4.MP.1)
- Model with mathematics (4.MP.4)

Materials

Copies	Kit Materials	Classroom Materials
Assessment Fraction & Decimal Checkpoint		
TM T4–T5 Fraction & Decimal Checkpoint	• base ten area pieces	
Work Places Introducing Work Place 3D Decimal More or Less		
TM T6 Work Place Guide 3D Decimal More or Less **TM T7** 3D Decimal More or Less Record Sheet **SB 120*** Work Place Instructions 3D Decimal More or Less	• spinner overlays (1 per student pair) • more/less dice (1 per student pair) • base ten area pieces, class set	
Work Places in Use		
2D Remainders Win (introduced in Unit 2, Module 4, Session 3) **2E** More or Less Multiplication (introduced in Unit 2, Module 4, Session 4) **3A** Dozens of Eggs (introduced Unit 2, Module 2, Session 4) **3B** Racing Fractions (introduced in Unit 3, Module 2, Session 6) **3C** Decimal Four Spins to Win (introduced in Unit 3, Module 3, Session 3) **3D** Decimal More or Less (introduced in this session)		
Home Connection		
HC 63–64 Decimals, Fractions & Story Problems		
Daily Practice		
SB 121 Decimal More or Less Challenges		

HC – Home Connection, **SB** – Student Book, **TM** – Teacher Master
Copy Instructions are located at the top of each teacher master. ** Run 1 copy of these pages for display.*
*** Run 1 copy of this page and store it for use by the teacher and other adult helpers during Work Place time.*

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

compare/comparison
decimal*
difference*
fraction*
greater than
less than
sixteenth
value

Preparation

- In today's session, you'll introduce Work Place 3D Decimal More or Less, which replaces Work Place 2C Moolah on My Mind. Before this session, you should review the Work Place Guide, as well as the Work Place Instructions. Make copies of the 3D Decimal More or Less Record Sheet for use today and store the rest in the Work Place 3D Decimal More or Less tray, along with the rest of the materials listed on the guide. The Work Place Guide also includes suggestions for differentiating the game to meet students' needs.
- Write the list of Work Places from which students can choose today. You can just write the numbers (2D–3D) or write out the full names if you prefer. (See the list in the Work Places in Use row of the Materials Chart for the complete list of Work Places used today.)

Assessment

Fraction & Decimal Checkpoint

1 Introduce today's activities.

- Let students know that they will take a quick assessment to show some of the things they have learned about fractions and decimals.
- After that, you will introduce a new Work Place game by playing a couple of rounds with the class and then inviting students to finish the game in pairs.
- When they have finished the game, they will spend any time remaining in the session at Work Places.

2 Display the Fraction & Decimal Checkpoint and give students a minute to look it over and ask any questions. Then, have them start work.

- Let students know that they can use a set of base ten pieces during the assessment, and tell them how to access these materials.
- Encourage students to read each question carefully and remind them they can ask you for help reading any of the questions.
- While students work, walk around the room to make observations and answer questions.
- Give students about 15 minutes or so to do the checkpoint. As this is not a timed test, if you have students who do not finish the checkpoint in 20 minutes, give them a chance to finish later on.
- If some students finish much earlier than others, ask them to quietly begin Work Places.

3 Collect students' checkpoints.

Note See the Grade 4 Assessment Guide for scoring and intervention suggestions.

Work Places

Introducing Work Place 3D Decimal More or Less

4 Display a copy of the 3D Decimal More or Less Record Sheet. Tell students they are going to learn a new Work Place that will give them practice comparing decimals.

5 Briefly summarize the game before playing against the class.

Players roll a more/less die to determine whether they are trying to build a number that is greater than or less than their partner's. Players take three turns each using a spinner, deciding if they want the number they spun to represent ones, tenths, or hundredths on

their record sheets, and building the number with base ten pieces. After each player has built a 3-digit number, they compare their numbers. Depending on what was rolled at the beginning of the round, the player with the larger or smaller decimal number wins.

6 Give students each a copy of the 3D Decimal More or Less Record Sheet. Play the first two rounds of the game against the class. Use your copy of the instructions from the Student Book as needed.

- Have students keep track of the results for both teams on their record sheets as you do so on your display copy.
- Invite different students up to take spins for the class.

7 Pose questions like the following to promote discussion of decimal skills and concepts while you play:

- How did you decide where you wanted to place the digit you spun?
- What digits would be best to place in the hundredths (ones, tenths) if you were playing for more? for less?
- What would the value of the digit you spun be if you placed it in the ones place? tenths? hundredths?
- You decided to use tenths. How many hundredths would that be?

While playing, make connections to money by comparing the digits in the tenths place to a number of dimes and the digit in the hundredths place as a number of pennies. Students can also consider money amounts when comparing numbers.

8 Ask students to find the Work Place Instructions 3D Decimal More or Less Student Book page and read the directions with a partner.

Ask if they have any questions about how to play the game.

9 Pair students and have them gather materials to play the last two rounds of the game with a partner.

Each student pair will need 1 more/less die, a spinner overlay, and 2 sets of base ten pieces in addition to their partially filled out record sheets.

Work Places

10 As students finish playing the last two rounds of Decimal More or Less, have them pick up their folders and choose one of the available Work Places.

- Remind students to fill out their Work Place Logs as they finish each game or activity.
- Encourage students to choose Work Places that will help them with skills and concepts that have been challenging for them in this unit.

SUPPORT Suggest specific Work Places for struggling students to work on critical skills.

CHALLENGE Encourage students to think about the strategies they use and share their thinking. Encourage students to generalize what happens in certain Work Places.

11 Circulate as students are working to observe and take notes, or pull small groups to help students who need support before the Post-Assessment coming up at the end of the unit. Use the Work Place Guides to find suggestions for differentiated instruction.

12 Close the session.

- Have students put away materials.

Home Connection

13 Introduce and assign the Decimals, Fractions & Story Problems Home Connection, which provides more practice with the following skills:

- Read and write decimal numbers with digits to the hundredths place (supports 4.NF)
- Express a fraction with denominator 10 as an equivalent fraction with denominator 100 (4.NF.5)
- Write fractions with denominator 10 or 100 in decimal notation (4.NF.6)
- Compare two decimal numbers with digits to the hundredths place; use the symbols >, =, and < to record comparisons (4.NF.7)

Daily Practice

The optional Decimal More or Less Challenges Student Book page provides additional opportunities to apply the following skills:

- Multiply two 2-digit numbers using strategies based on place value and the properties of operations (4.NBT.5)
- Compare two decimal numbers with digits to the hundredths place using the symbols >, =, and < to record the comparisons (4.NF.7)
- Explain why one decimal number must be greater than or less than another decimal number (4.NF.7)
- Express a measurement in a larger unit in terms of a smaller unit within the same system of measurement (4.MD.1)

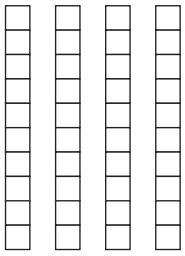
Teacher Masters

GRADE 4 – UNIT 3 – MODULE 3

BRIDGES®
IN MATHEMATICS

Thinking About Tenths & Hundredths

1 Carlos and Imani are having an argument. Carlos says the base ten pieces below show 4 tenths. Imani says they show 40 hundredths. Who is right? How do you know?



2 Use your base ten pieces to build the following numbers.

$\frac{2}{10}$	
$\frac{24}{100}$	
$\frac{15}{100}$	
$\frac{4}{10}$	
$\frac{50}{100}$	
$\frac{54}{100}$	
$\frac{7}{10}$	
$\frac{72}{100}$	
$\frac{62}{100}$	
$\frac{6}{10}$	
$\frac{10}{10}$	

Work Place Guide 3C Decimal Four Spins to Win

Summary

Players take four turns each spinning both spinners, recording the results of their spins, rewriting the first fraction as an equivalent fraction with denominator 100, adding the two fractions, writing the total as a fraction and a decimal number, and shading in one of their grids to show the total. Players use a different color to shade in their grids each time they take a turn. When both players have had four turns, each determines the total of all his spins. Then they record and compare their total to their partner's total. The player with the total closer to 3.00, either under or over, wins.

Skills & Concepts

- Express a fraction with denominator 10 as an equivalent fraction with denominator 100; add a fraction with denominator 10 to a fraction with denominator 100 by rewriting the first fraction as an equivalent fraction with denominator 100 (4.NF.5)
- Write fractions with denominator 100 in decimal notation (4.NF.6)
- Compare two decimal numbers with digits to the hundredths place; use the symbols >, =, and < to record the comparisons (4.NF.7)
- Represent decimal numbers with digits to the hundredths place using place value models (supports 4.NF)

Materials

Copies	Kit Materials	Classroom Materials
TM T2 Work Place Guide 3C Decimal Four Spins to Win **TM T3** 3C Decimal Four Spins to Win Record Sheet **SB 120** Work Place Instructions 3C Decimal Four Spins to Win	• 3 spinner overlays • 3 sets of base ten area pieces	• colored pencils or crayons in several different colors

Assessment & Differentiation

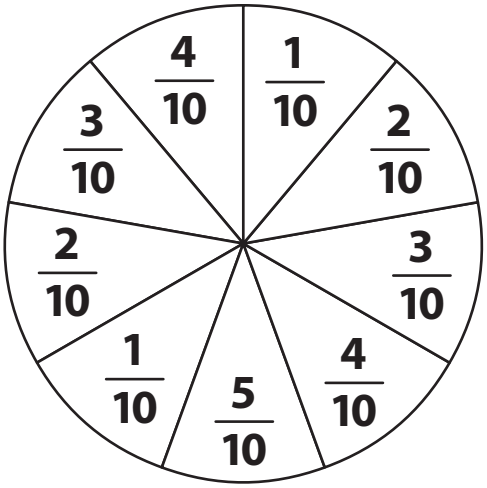
If you see that…	Differentiate	Example
One or more students have trouble rewriting fractions with denominator 10 as fractions with denominator 100, or adding the two fractions they spin.	SUPPORT Have these students use base ten pieces to represent the results of each spin. By noting that each base ten strip representing a tenth is divided into 10 units, students can see that $\frac{2}{10} = \frac{20}{100}$.	***Teacher*** *Can you use the base ten pieces to show $\frac{2}{10}$ and $\frac{35}{100}$??* ***Student*** *I can use the strips, so 10, 20 for the $\frac{2}{10}$, and 10, 20, 30, and then 5 of the little squares. But I still don't know what to do. Now I have 5 tenths and 5 hundredths.* ***Teacher*** *How many hundredths are there in each tenth; each strip? How many in all?* ***Student*** *10, 20, 30, 40, 50, 55 — hundredths in all. OK, I get it. If I change everything to hundredths, then I can add the fractions and get the answer.*
One or more students have difficulty remembering and carrying out each step in the game.	SUPPORT Gather a small group to work as a team against you. At each turn, reiterate the steps and share your thinking. SUPPORT Pair these students with classmates who understand how to play the game and invite them to try game variation A.	
One or more students easily add fractions and decimals.	CHALLENGE Invite students of similar ability to try game variation B or invent another variation.	

English-Language Learners Use the following adaptations to support the ELL students in your classroom.

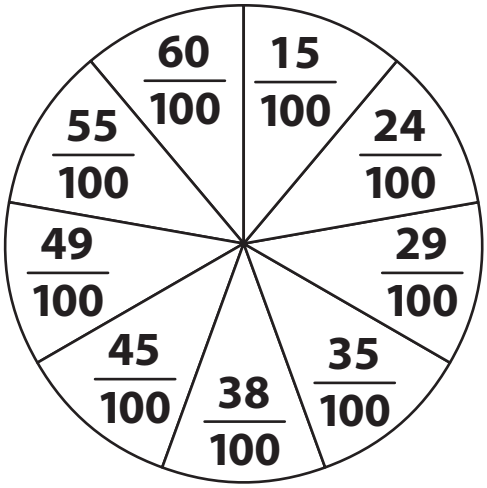
- Have ELL students observe other students playing the game before playing it themselves.
- Pair each ELL student with a supportive partner who can explain the instructions while they play.
- Play the game with the ELL students yourself. Emphasize how to rewrite tenths as hundredths in order to add the two fractions spun each time.
- Once students are playing the game with understanding, ask them to verbalize and demonstrate their strategies.

NAME | **DATE**

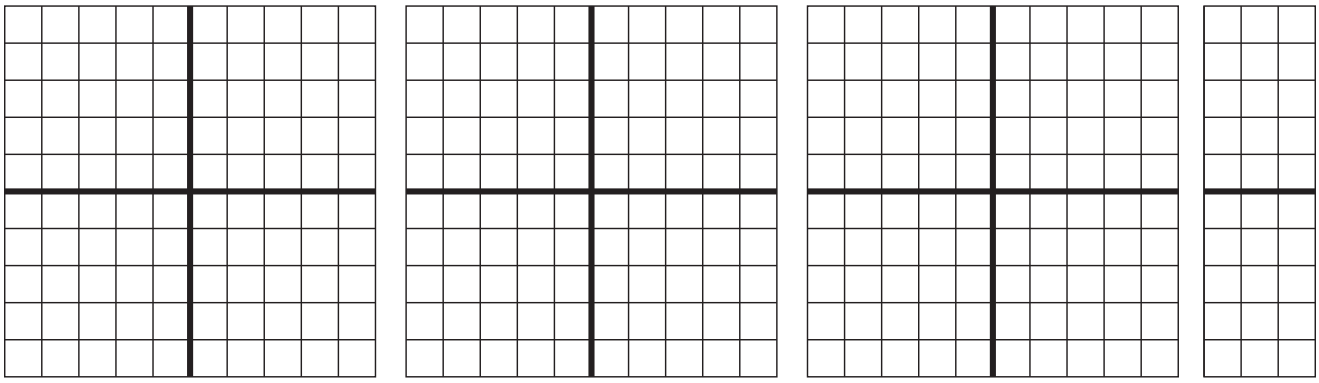
3C Decimal Four Spins to Win Record Sheet



+



Spin 1	$\overline{10} + \overline{100} = \overline{100} + \overline{100} = \overline{100}$ or 0. _____	**Work Space**
Spin 2	$\overline{10} + \overline{100} = \overline{100} + \overline{100} = \overline{100}$ or 0. _____	
Spin 3	$\overline{10} + \overline{100} = \overline{100} + \overline{100} = \overline{100}$ or 0. _____	
Spin 4	$\overline{10} + \overline{100} = \overline{100} + \overline{100} = \overline{100}$ or 0. _____	



Use >, =, or < to compare your total to your partner's total. Circle the score closer to 3.00, under or over.

_____ My Total _____ My Partner's Total

NAME | **DATE**

Fraction & Decimal Checkpoint page 1 of 2

1 Julie and Charlotte baked a chocolate cake for their mother's birthday. They decided to cut the cake into sixteenths.

a Julie ate $\frac{3}{16}$ of the cake and Charlotte ate $\frac{4}{16}$. How much did the girls eat together? Show your work.

b Mom ate $\frac{2}{16}$ and Dad ate $\frac{2}{16}$ of the cake. Write two different fraction names to describe how much cake the parents ate together.

c After Julie, Charlotte, Mom, and Dad ate their cake, how much was left? Show your work.

d How much more cake did Charlotte eat than Mom? Write two fraction names to describe how much more Charlotte ate.

2 Simon got $\frac{6}{8}$ of a pizza and Ricardo got $\frac{1}{2}$ of a pizza exactly the same size.

a Who got more pizza? _____

b Fill in the blank with the correct symbol to complete the comparison. (<, >, =)

$$\frac{6}{8} \quad \frac{1}{2}$$

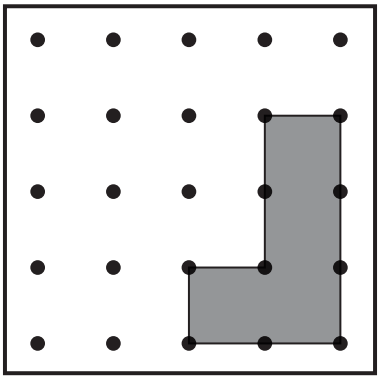
c Use numbers, labeled sketches, or words to show why one of these fractions is greater than the other.

(continued on next page)

NAME | **DATE**

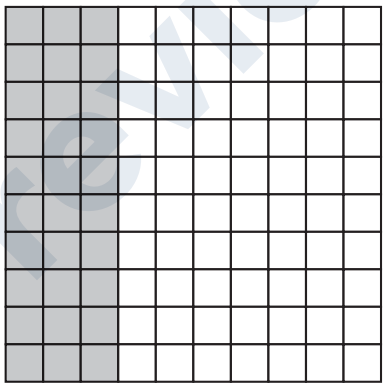
Fraction & Decimal Checkpoint page 2 of 2

3 If the area of the entire geoboard is 1 square unit, what fraction of the geoboard is shaded in? Fill in the bubble to show.



○ $\frac{12}{16}$ ○ $\frac{4}{12}$ ○ $\frac{1}{4}$ ○ $\frac{1}{3}$

4 The grid below represents 1. Write two fraction names and two decimal names to show the amount that is shaded in.



Fractions		Decimals	

5 Fill in the blank with the correct symbol. (<, >, =)

a 0.70 _____ 0.07

b 0.35 _____ 3.5

Work Place Guide 3D Decimal More or Less

Summary

Players roll a more/less die to determine whether they are trying to build a number that is greater than or less than their partner's. Players take three turns each using a spinner, deciding if they want the number they spun to represent ones, tenths, or hundredths on their record sheets, and building the number with base ten pieces. After each player has built a 3-digit number, they compare their numbers. Depending on what was rolled at the beginning of the game, the player with the larger or smaller decimal number wins.

Skills & Concepts

- Read and write decimal numbers with digits to the hundredths place (supports 4.NF)
- Represent decimal numbers with digits to the hundredths place using place value models (supports 4.NF)
- Compare two decimal numbers with digits to the hundredths place (4.NF.7)
- Explain why one decimal number must be greater than or less than another decimal number (4.NF.7)

Materials

Copies	Kit Materials	Classroom Materials
TM T6 Work Place Guide 3D Decimal More or Less **TM T7** 3D Decimal More or Less Record Sheet **SB 122** Work Place Instructions 3D Decimal More or Less	• 3 spinner overlays • 3 more/less cubes • 6 sets of base ten area pieces	

Assessment & Differentiation

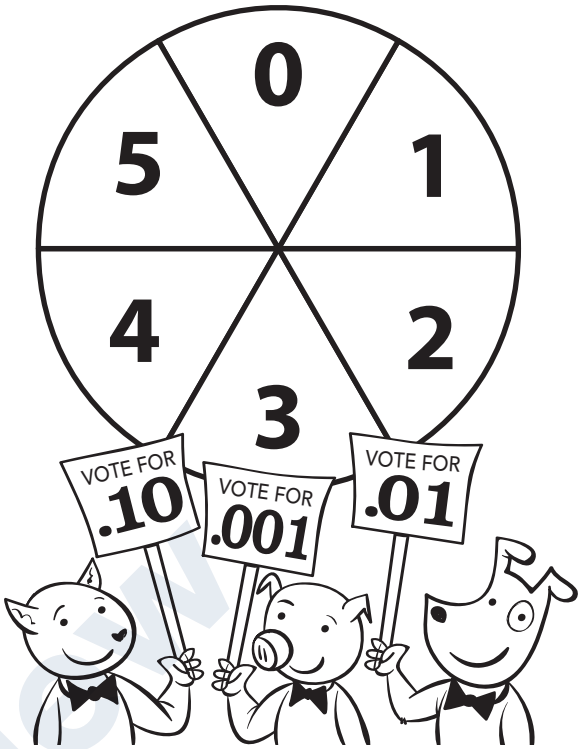
If you see that…	Differentiate	Example
One or more students do not consider the value of numbers when placing them in an available spot.	SUPPORT Play with students and think aloud about the value of the numbers you spin.	"We are playing this round for 'more.' I spun a 4, and that's one of the biggest numbers. I can picture 4 whole mats in my head, and that's a lot bigger than 4 strips or 4 units. It isn't very likely I'll spin a 5, so I want the 4 in the ones, I think."
One or more students have difficulty determining who wins each round.	SUPPORT Model how to use base ten pieces to compare the two numbers.	
One or more students easily compare the two numbers built.	CHALLENGE Have students play game variation A and find the difference between their numbers.	

English-Language Learners Use the following adaptations to support the ELL students in your classroom.

- Have ELL students observe other students playing the game before playing it themselves.
- Pair each ELL student with a supportive partner (an English-speaking student or another ELL student with more command of English) who can offer support and explain the instructions while they play.
- Play the game with the ELL students yourself. Model how to play and put emphasis on how to model the decimals with base ten pieces and deciding where to put digits.
- Once students are playing the game with understanding, try to get them to verbalize and demonstrate their strategies.

NAME | **DATE**

3D Decimal More or Less Record Sheet



Example		
We played for (circle one)	**more**	**less**
Player 1 4 + . 3 + . 0 1 = 4 . 3 1		
Player 2 3 + . 2 + . 0 1 = 3 . 2 1		
The winner won by 1 . 1 0		

Round 1		
We played for (circle one)	**more**	**less**
Player 1 ____ + . ____ + . 0 ____ = ____ . ____ ____		
Player 2 ____ + . ____ + . 0 ____ = ____ . ____ ____		
The winner won by ____ . ____ ____		

Round 2		
We played for (circle one)	**more**	**less**
Player 1 ____ + . ____ + . 0 ____ = ____ . ____ ____		
Player 2 ____ + . ____ + . 0 ____ = ____ . ____ ____		
The winner won by ____ . ____ ____		

Round 3		
We played for (circle one)	**more**	**less**
Player 1 ____ + . ____ + . 0 ____ = ____ . ____ ____		
Player 2 ____ + . ____ + . 0 ____ = ____ . ____ ____		
The winner won by ____ . ____ ____		

Round 4		
We played for (circle one)	**more**	**less**
Player 1 ____ + . ____ + . 0 ____ = ____ . ____ ____		
Player 2 ____ + . ____ + . 0 ____ = ____ . ____ ____		
The winner won by ____ . ____ ____		

Student Book

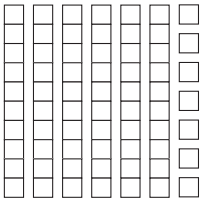
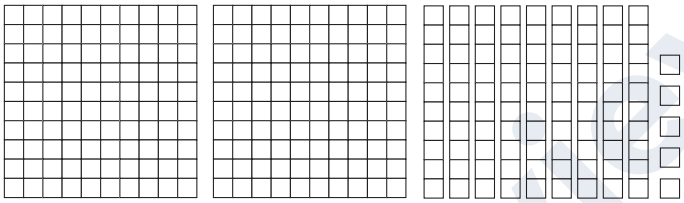
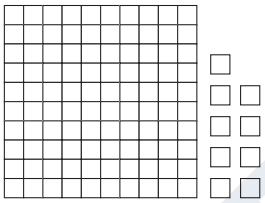
GRADE 4 – UNIT 3 – MODULE 3

BRIDGES®
IN MATHEMATICS

NAME | DATE

Decimals Are Fractions page 1 of 2

1 Write the decimal and fraction for each collection in the table below.

Collection	Decimal	Fraction
a 		
b 		
c 		
d 		

2 Sketch base ten pieces to show the minimal collection for each decimal. Then, write the number as a fraction. (A minimal collection is one that uses the fewest possible number of pieces.)

Decimal	Collection	Fraction
a 0.75		
b 0.25		
c 1.99		
d 2.03		

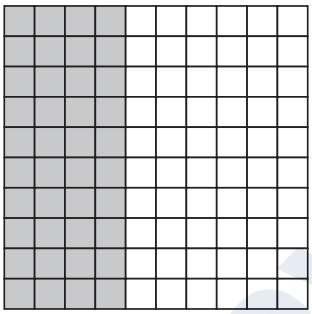
(continued on next page)

NAME | DATE

Decimals Are Fractions page 2 of 2

3 Write the numbers 0.75, 0.25, 1.99, and 2.03 in their approximate places on the number line below.

4 The value of the mat is 1.



a How many tenths are shaded on the mat?

b How many hundredths are shaded on the mat? How do you know?

c Write two fraction names for the shaded amount.

d Write two decimal names for the shaded amount.

5 Use numbers, words, or sketches to record at least two different observations about decimals and fractions.

NAME | DATE

Money, Decimals & Fractions

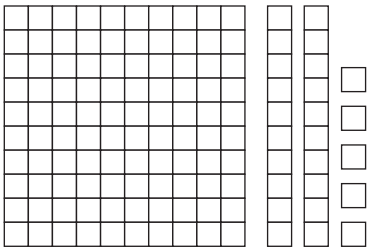
1 Sketch base ten pieces to show the value of each number.

a 3.18

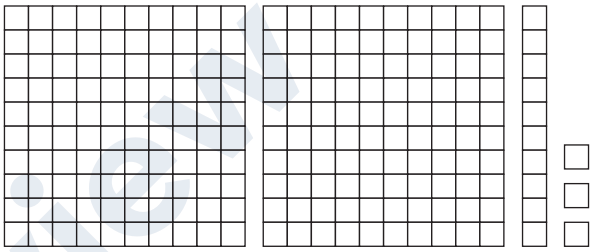
b 4.68

2 Write a decimal number for each collection of base ten area pieces below.

a



b



3 Fill in the table to show each value as money, a decimal, or a fraction.

Money	Decimal	Fraction
\$5.26	5.26	$5\frac{26}{100}$
	4.08	
		$2\frac{39}{100}$
\$8.40		
		$1\frac{6}{10}$

4 Write this number as a decimal: one and fifty-six hundredths.

5 Write this decimal number in words: 2.94.

NAME | DATE

Comparing Decimals & Fractions page 1 of 2

For all questions below, write an inequality using the symbols < or > to show your answer.

1 Two baby hummingbirds hatched last week at the zoo. A researcher is keeping track of their weights. Today Baby A weighs 1.2 grams and Baby B weighs 1.09 grams. Which is heavier, Baby A or Baby B?

2 Rosario and her friend Keiko walked in the walkathon to benefit the animal shelter. Rosario walked 3.41 miles, and Keiko walked 3.8 miles. Who walked farther?

3 A giant panda at the Beijing Zoo in China had twins named Lucy and Lei. Giant pandas can weigh over 200 pounds when fully grown, but they have very tiny babies. When they were born, Lei weighed 5.29 ounces and Lucy weighed 5.9 ounces. Which twin was heavier?

(continued on next page)

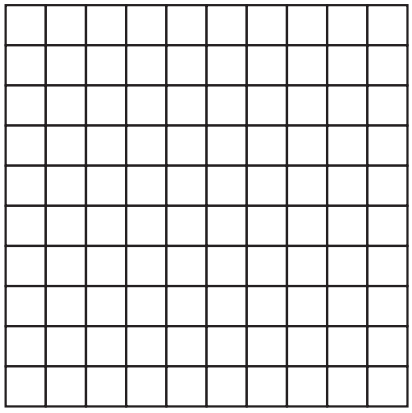
NAME | DATE

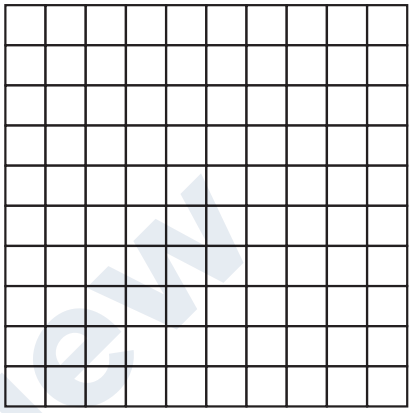
Comparing Decimals & Fractions page 2 of 2

4 Which fraction is larger: $\frac{6}{10}$ or $\frac{49}{100}$?

a Explain why you think so.

b Draw each fraction on a grid below to verify your answer.

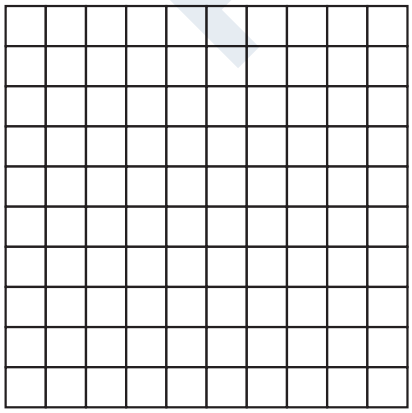


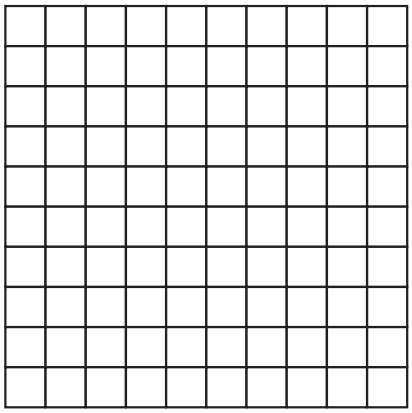


c Record each fraction as a decimal number.

$\frac{6}{10} =$ $\frac{49}{100} =$

5 **a** On each grid below: shade in and label a different number between 0.45 and 0.5.





b Compare the numbers. Write an inequality using the symbol < or > to show which number is larger.

NAME | DATE

Number Riddles

1 Draw a line to show which number matches each description. This first one has been done for you as an example.

ex	This number has a 2 in the thousands place.	58,252
a	This number has a 5 in the tenths place.	6.37
b	This number is even and has an 8 in the thousands place.	8,711
c	This number is less than 10 and has a 7 in the hundredths place.	62,189
d	This number is odd and has a 7 in the hundreds place.	800.51

2 Write each number in words.

a 1.89

b 2.03

c Use a symbol (<, >, =) to compare these numbers: 1.89 _____ 2.03.

3 Write each number as a decimal and a mixed number:

a Three and eighty-three hundredths _____ _____

b Four and six hundredths _____ _____

c Use a symbol (<, >, =) to compare the two numbers in 3a and 3b.

_____ ___ _____

4 **CHALLENGE** Write an even number that has a 7 in the hundreds place, an odd number in the thousands place, and is a multiple of 10.

Work Place Instructions 3C Decimal Four Spins to Win

Each pair of players needs:

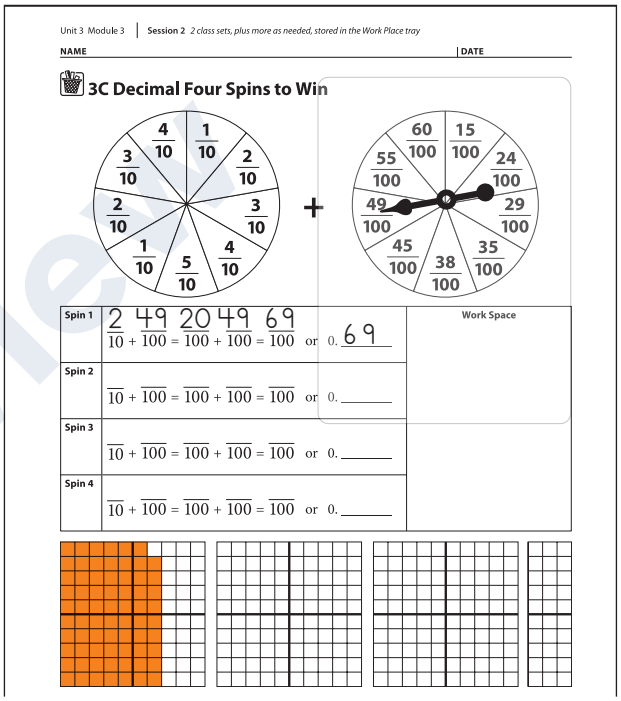
- 2 Decimal Four Spins to Win Record Sheets
- 1 set of base ten area pieces
- 1 spinner overlay
- colored pencils or crayons in several different colors

1 Players spin the second (hundredths) spinner on the record sheet. The player with the larger fraction goes first.

2 Player 1 spins both spinners and records the results in his Spin 1 box. Then he:

- Rewrites the first fraction as an equivalent fraction with denominator 100
- Adds the two fractions
- Shows the answer as a fraction and as a decimal
- Colors in the first grid to show the results of his spin

> ***Pedro*** *OK, I got $\frac{2}{10}$ and $\frac{49}{100}$. I know $\frac{2}{10}$ is the same as $\frac{20}{100}$, so I'll write that and add my fractions. It's $\frac{69}{100}$ in all. Now I have to color in the first grid to show what I got.*



3 Player 2 takes a turn to spin, record, add, and color in the results on her record sheet.

4 Players take turns until they have each had 4 turns.

- Players must be sure to use a different color to shade in their grids each time they take a turn.
- It's OK to go over 3.00. (That's what the 3 extra tenths at the end of row of grids are for; don't use them unless you have to.)

5 After each player has taken four turns, they each find their total and record it on their sheet.

Note It's a very good idea to double-check the totals. If a player found the total by looking at her grids, she should also use the work space on her sheet to add the four decimal numbers. (It's fine to use the base ten pieces to help add these numbers.)

6 Players each record their partner's total, compare the two, and circle the total that's closer to 3.00, either under or over.

Game Variation

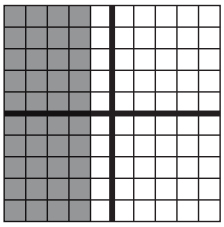
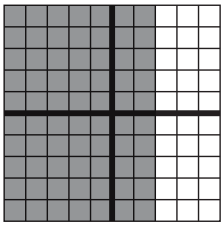
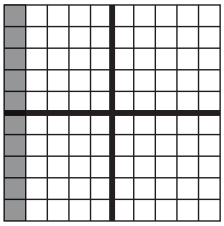
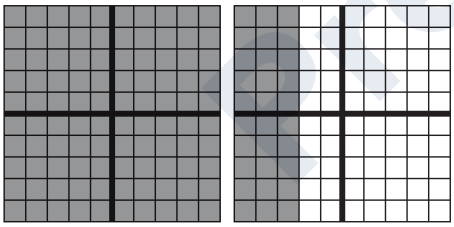
A Players work together, using one record sheet, to see how close they can come to 3.00, instead of playing competitively. (They can play the game twice and see if they can get closer to 3.00 the second time.)

B Players use the rule that they can't go over 3.00. If they play using this variation, they don't have to take all 4 turns. They can decide to hold at 3 turns if it looks like a fourth turn might take them over 3.00. This variation is scored the same way as the regular version—players find their totals, and the score closer to 3.00 wins.

NAME | DATE

Tenths & Hundredths

1 Each grid below has a value of 1.0. Write two fractions and two decimals to show the amount shaded in on each.

		Fractions	Decimals
ex		$\frac{4}{10}$ $\frac{40}{100}$	0.4 0.40
a			
b			
c			

2 Rewrite each fraction as an equivalent fraction with denominator 100. (The first one is done for you.)

$\frac{2}{10} = \frac{20}{100}$ $\frac{9}{10} =$ $\frac{1}{10} =$ $\frac{8}{10} =$ $\frac{5}{10} =$

3 Add these pairs of fractions. Express the answer for each as a fraction with denominator 100.

$\frac{2}{10} + \frac{35}{100} =$ $\frac{9}{10} + \frac{6}{100} =$ $\frac{1}{10} + \frac{89}{100} =$ $\frac{8}{10} + \frac{13}{100} =$

Work Place Instructions 3D Decimal More or Less

Each pair of players needs:

- 2 Decimal More or Less Record Sheets
- 2 sets of base ten area pieces
- 1 spinner overlay
- 1 more/less die

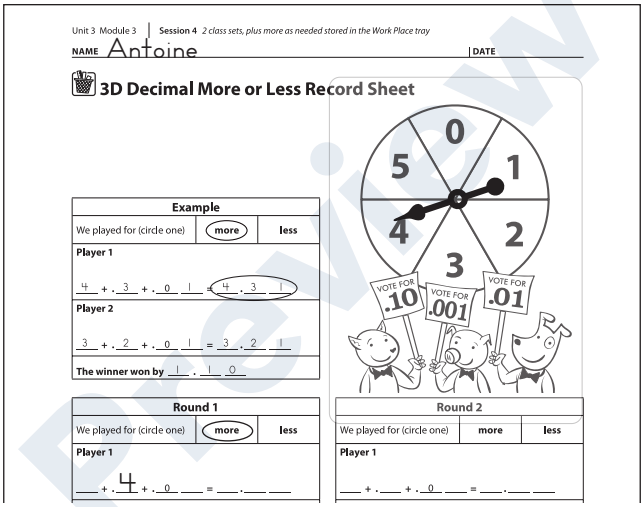
1 Players roll the more/less die to determine whether they will play for more or less in the first round. They circle the word *more* or *less* on their record sheets to show.

2 Players spin the Decimal More or Less Spinner. The player with the larger number goes first.

3 Player 1 spins the spinner and decides whether to place the number in the ones, tenths, or hundredths place. Both players write Player 1's number on their record sheets.

Note Once a number has been placed, it cannot be moved.

4 Then Player 1 sets out base ten area pieces to show the value of the number spun.


Unit 3 Module 3 | Session 4 *2 class sets, plus more as needed stored in the Work Place tray*

NAME Antoine | DATE

3D Decimal More or Less Record Sheet

Example		
We played for (circle one)	more	less
Player 1		
4 + .3 + .01 = 4.31		
Player 2		
3 + .2 + .01 = 3.21		
The winner won by 1.10		

Round 1		
We played for (circle one)	more	less
Player 1		
4 + .0 = .		

Round 2		
We played for (circle one)	more	less
Player 1		
+ . + .0 = .		

Antoine *I got a 4, so I put it in the tenths place. We're playing for more, so I could still get a 5 to put in the ones place. I put out 4 strips to show four-tenths.*

5 Players take turns until they have each taken 3 spins. After each spin, the player decides where to place the new number and sets out base ten area pieces to show the value of the number.

6 After each player has taken three turns, players find the sum of their numbers and record it on their sheets.

7 Players read their numbers aloud and compare them.

8 Depending on what was rolled at the beginning of the round, the player with the higher or lower sum wins that round. Both players mark the winner for the round on their record sheets.

9 Players start the next round by rolling the more/less die again, and continue playing until they have completed all four rounds on the sheet.

Game Variation

A Players determine how much the winner won by each time and use the difference between the numbers as a score. After four rounds, players add their scores and then roll the more/less die to determine the overall winner.

NAME | DATE

Decimal More or Less Challenges

1 Allen played Decimal More or Less with the record sheet below. He spun a 1 on his second turn. Where should Allen place the 1? Explain your thinking.

Round 1		
We played for (circle one)	more	less
Player 1 5 + . ___ + . 0 ___ = ___ . ___ ___		
Player 2 ___ + . ___ + . 0 ___ = ___ . ___ ___		
The winner won by ___ . ___ ___		

2 Kathy (Player 1) and Logan (Player 2) played Decimal More or Less with the record sheet below. Who won? By how much? Show your work.

Round 1		
We played for (circle one)	more	less
Player 1 1 + . 3 + . 0 5 = 1 . 3 5		
Player 2 3 + . 2 + . 0 5 = 3 . 2 5		
The winner won by ___ . ___ ___		

3 Fill in the blanks with the correct symbols. (< , > , =)

a 3 km ___ 3000 m **b** 1.5 ml ___ 1500 l **c** 10.4 ___ 10.09

4 Here is part of a ratio table Becky made. Use it to answer the following questions:

12	13	14	15	16	17	18	19
156	169	182	195	208	221	234	247

a What number is Becky counting by? _____

b What will be the 24th number on Becky's table? _____

c What will be the 30th number on Becky's table? _____

Home Connections

GRADE 4 – UNIT 3 – MODULE 3

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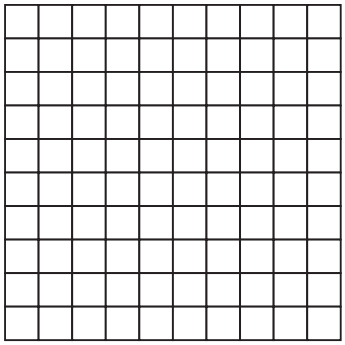
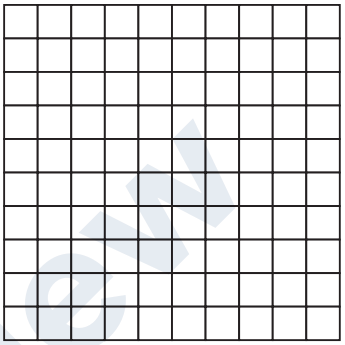
More Comparing Decimals & Fractions page 1 of 2

1 Which fraction is larger: $\frac{8}{10}$ or $\frac{73}{100}$?

a Explain why you think so.

b Draw each fraction on a grid below to verify your answer.

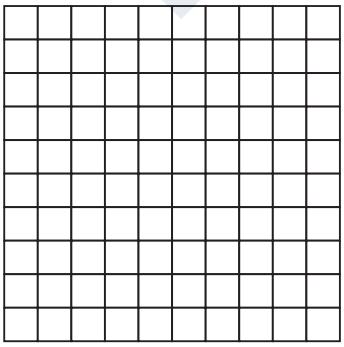


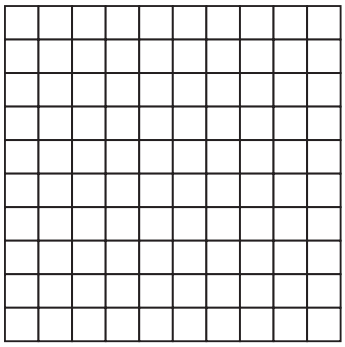


c Record each fraction as a decimal number.

$\frac{8}{10}$ _____ $\frac{73}{100}$ _____

2 On the first grid below, shade a number between 0.75 and 0.8 and label it. Then shade in and label a different number between 0.75 and 0.8 on the second grid.





_____ _____

a Compare the two numbers you shaded in the grids. Write an inequality using the symbol < or > to show which number is larger.

(continued on next page)

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More Comparing Decimals & Fractions page 2 of 2

3 Write these numbers as decimals:

a Two and eighty-three hundredths _____

b One and six hundredths _____

4 Write this decimal number in words: 2.94.

5 Fill in each blank with <, >, or =.

a 0.8 _____ 0.78 **b** 0.56 _____ 0.6 **c** 0.6 _____ 0.60

6 Allison says that 1.06 is bigger than 1.2 because 6 is bigger than 2. Do you agree or disagree? Explain.

7 Erik is 4.23 feet tall. Stacy is 4.3 feet tall. Who is taller? Explain.

8 **CHALLENGE** One year ago, Charlie's chameleon was 8.42 inches long. Now his chameleon is 9.36 inches long. Show your work with numbers, labeled sketches, or words for each question below.

a How much did Charlie's chameleon grow in the last year?

b How much more does his chameleon need to grow to be exactly 10 inches?

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Decimals, Fractions & Story Problems page 1 of 2

1 Write the place value of the underlined digit in each number. The place values are spelled correctly for you here:

hundreds tens ones tenths hundredths

ex 2.0<u>3</u> hundredths	**a** 3.<u>1</u>7
b 12<u>0</u>.4	**c** <u>5</u>06.92
d 54.2<u>9</u>	**e** 32.<u>7</u>

2 Write each decimal number.

ex Twenty-three and two-tenths: 23.2

ex One hundred thirty and five-hundredths: 130.05

a Six and seven-hundredths: _____

b Two-hundred sixty-five and eight-tenths: _____

3 Write each fraction or mixed number as a decimal number.

ex $5\frac{3}{10}$ 5.3	**ex** $12\frac{4}{100}$ 12.04	**ex** $3\frac{17}{100}$ 3.17
a $\frac{7}{10}$	**b** $3\frac{5}{100}$	**c** $\frac{4}{100}$
d $4\frac{38}{100}$	**e** $1\frac{9}{100}$	**f** $1\frac{9}{10}$

4 Use a greater than (>), less than (<), or equal sign to show the relationship between the decimal numbers below.

ex 1.09 < 1.9	**a** 1.12 ___ 1.2	**b** 3.5 ___ 3.48
c 23.81 ___ 23.85	**d** 4.50 ___ 4.5	**e** 3.06 ___ 3.65

(continued on next page)

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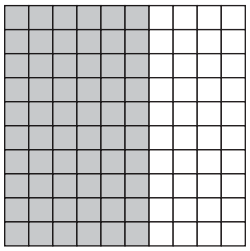
Decimals, Fractions & Story Problems page 2 of 2

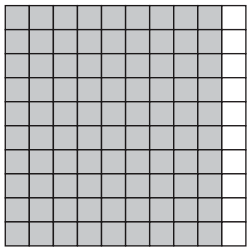
5 Write two fractions to show what part of each mat has been shaded in—one with denominator 10 and an equivalent fraction with denominator 100.

ex



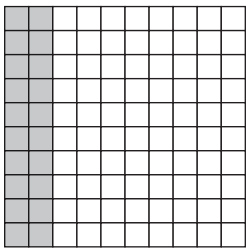
$\frac{6}{10} = \frac{60}{100}$

a



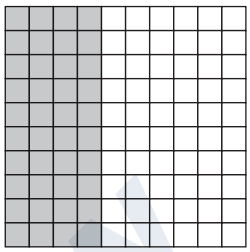
_____ = _____

b



_____ = _____

c



_____ = _____

6 Last Friday, Ray went home with his cousin Jewel after school. They took the city bus to Jewel's house. It costs $1.65 to ride the bus. Ray had 5 quarters, a dime, and 3 nickels. How much more money did he need to ride the bus? Show all your work.

a How much did it cost Ray and Jewel to ride the bus in all? Show all your work.

7 Ray's school is 1.7 miles from his house. He walks to and from school every day. How many miles does he walk each day? Show all your work.

a **CHALLENGE** How many miles does he walk in a 5-day school week? Show all your work.