UNIT 5

Fractions and

Learning Goals

- model, name, and record fractions of a whole and of a set
- compare and order fractions
- relate tenths and hundredths as decimals and fractions
- explore equivalent decimals
- use decimals to record money values
- add and subtract decimals and money
- identify everyday contexts in which fractions and decimals are used

Decimals

The Grade 4 students are holding an Activities Day to celebrate the arrival of spring.

In the Egg Race, the winner is the person who puts the most plastic eggs into the cartons. Here are some results.

Name	Carton Filled
Penny	$\frac{4}{12}$
Maria	$\frac{11}{12}$
Brady	$\frac{7}{12}$

- What does the fraction $\frac{4}{12}$ mean?
- Where have you seen fractions like those in the table? How were they used?
- What are some questions you can ask about the Egg Race?

Key Words

fifths

tenths

numerator

denominator

proper fraction

unit fraction

decimal

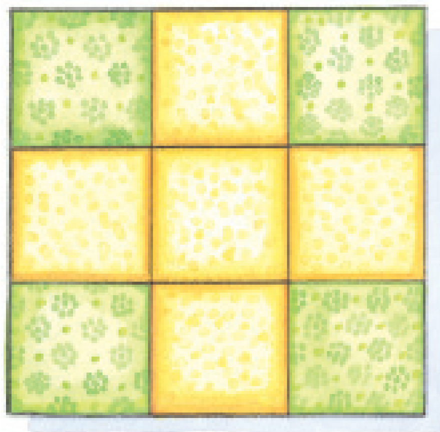
decimal point

one-hundredth

equivalent decimals

LESSON 1

Fractions of a Whole



Pioneers made quilts from scraps of material sewn together.
Square pieces are easy to fit together.

Explore

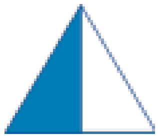
You will need Colour Tiles or congruent squares, and 1-cm grid paper.
Design a quilt that uses squares of at least 3 colours.
Record your quilt on grid paper.
Use fractions to describe your quilt.

Show and Share

Trade quilts with your partner.
Describe your partner's quilt using words and fractions.
How did you know which fractions to use?

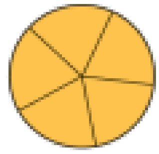
Connect

Fractions name equal parts of a whole.

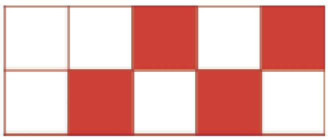


2 equal parts are halves.
$\frac{1}{2}$ or one-half is blue.

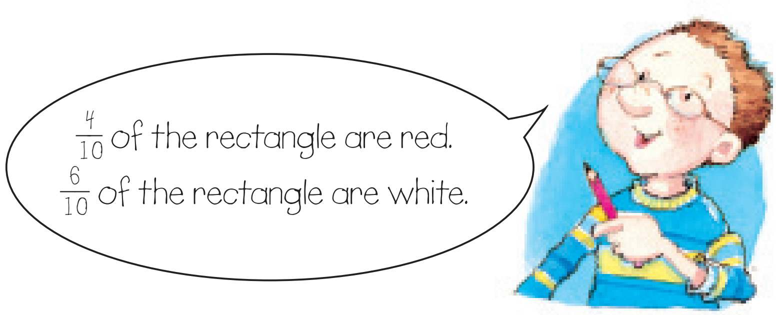
4 equal parts are fourths.
$\frac{2}{4}$ or two-fourths are green.



5 equal parts are **fifths**.
$\frac{5}{5}$ or five-fifths are yellow.



10 equal parts are **tenths**.
$\frac{4}{10}$ or four-tenths are red.



$$\frac{4}{10}$$

10 is the **denominator**.
It tells how many
equal parts are in 1 whole.

4 is the **numerator**.
It tells how many
equal parts are counted.

A fraction is a number.

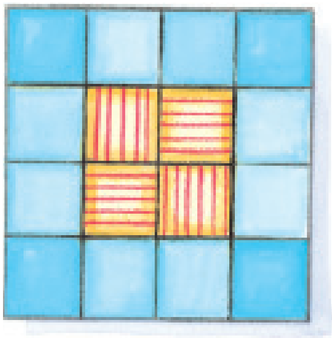
$\frac{4}{10}$ is a **proper fraction**.
It represents an amount less than 1 whole.

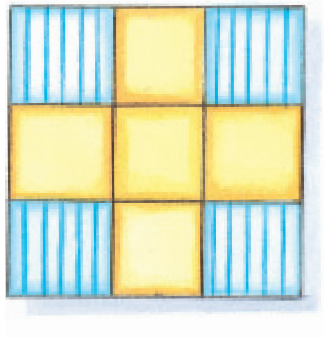
$\frac{5}{5}$ is a fraction.
It represents an amount equal to 1 whole.

Practice

1. Use Colour Tiles or congruent squares to show each fraction.
Record your work on grid paper.
a) $\frac{2}{3}$ **b)** $\frac{6}{10}$ **c)** one-eighth **d)** four-fifths

2. Write a fraction to tell what part of each quilt is striped.

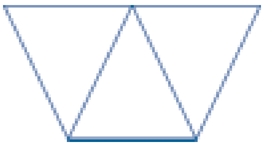
a) 

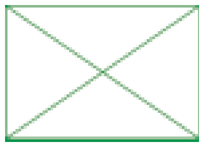
b) 

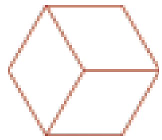
c) 

3. Write a fraction to tell what part of each quilt in question 2 is *not* striped.

4. Which pictures show thirds? How do you know?

a) 

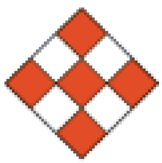
b) 

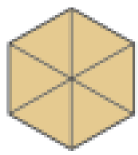
c) 

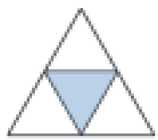
5. Does this diagram show $\frac{3}{4}$? Explain.

6. Write a fraction to describe the shaded part of each shape.

a) 

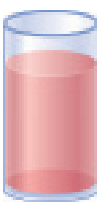
b) 

c) 

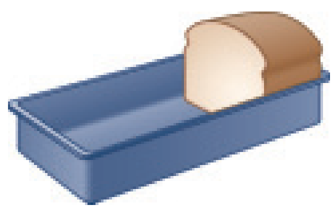
d) 

7. Write a fraction to tell what part of each shape in question 6 is *not* shaded.

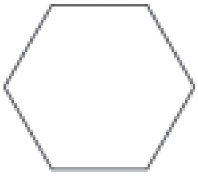
8. About what fraction of each container is filled?

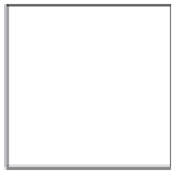
a) 

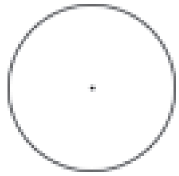
b) 

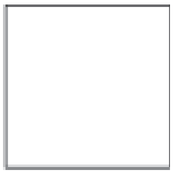
c) 

9. Use a copy of these shapes.
Shade each shape to show the given fraction.

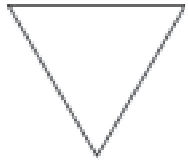
a) Show $\frac{1}{2}$. 

b) Show $\frac{7}{8}$. 

c) Show $\frac{3}{4}$. 

d) Show $\frac{2}{3}$. 

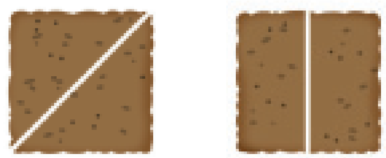
e) Show $\frac{5}{6}$. 

f) Show $\frac{2}{2}$. 

10. Look around your classroom.
Find an item that is divided into equal parts.
Sketch the item. Name the equal parts.

11. Use grid paper.
Design a place mat by colouring squares in a rectangle.
Use fractions to describe your place mat design.

12. Nadia shares her square brownie with Tran.
Here are two ways to cut the brownie.
Are the pieces the same size?
Show your work.



Math Link

Physical Education

A volleyball court is divided into 2 equal parts. What other sports are played on a region that is divided into equal parts?

Reflect

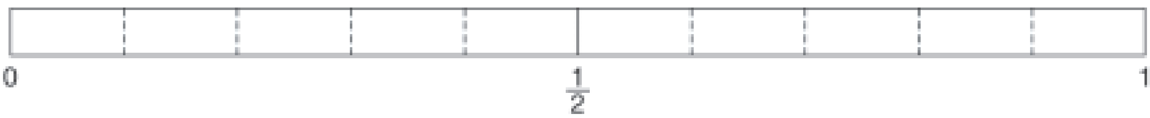
Use pictures, words, or numbers to explain the fraction $\frac{5}{8}$.

LESSON 2

Fraction Benchmarks

Explore

You will need 6 strips of squared paper the same length as this strip.



➤ Colour a paper strip to show $\frac{3}{10}$.
Line up your strip with the strip above.
Is $\frac{3}{10}$ closer to 0, $\frac{1}{2}$, or 1?

➤ Estimate if each fraction in the box is closer to 0, $\frac{1}{2}$, or 1.
Use paper strips to check your estimates.
Record your findings in a table.

$\frac{3}{10}$	$\frac{9}{10}$	$\frac{6}{10}$
$\frac{1}{10}$	$\frac{7}{10}$	$\frac{2}{10}$

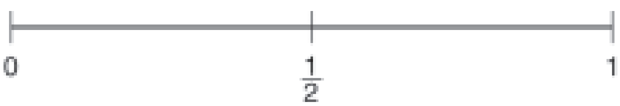
Closer to 0	Closer to $\frac{1}{2}$	Closer to 1

Show *and* Share

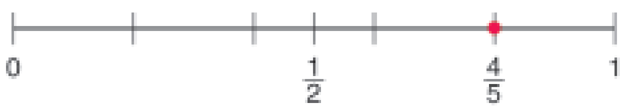
Talk with your partner about the fractions.
Which fraction is closest to 0? Closest to $\frac{1}{2}$? Closest to 1?

Connect

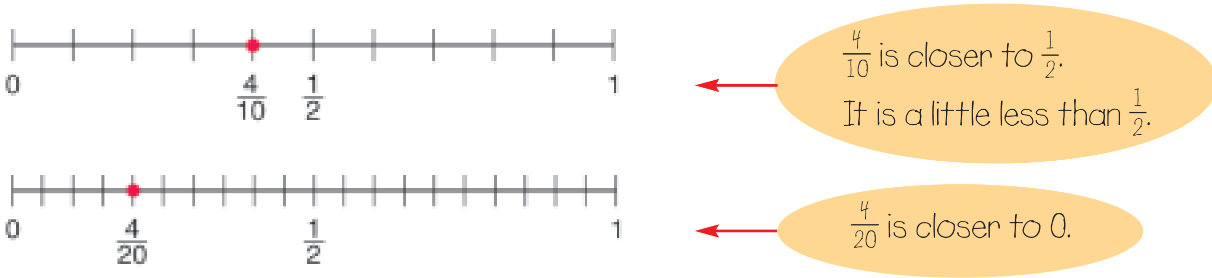
This number line shows the benchmarks 0, $\frac{1}{2}$, and 1.



You can use number lines with the same length to find which benchmark each of $\frac{4}{5}$, $\frac{4}{10}$, and $\frac{4}{20}$ is closer to.



$\frac{4}{5}$ is closer to 1.

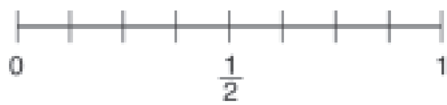


Practice

1. Is the fraction of juice left in each glass closer to 0, $\frac{1}{2}$, or 1?

a)

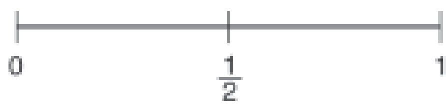
2. Use a copy of this number line.
Place $\frac{7}{8}$, $\frac{1}{8}$, and $\frac{3}{8}$ on the number line.
Which benchmark is each fraction closer to?



3. Name a fraction between $\frac{1}{2}$ and 1, but closer to 1.
Draw a picture to show the fraction.
Tell how you chose which fraction to draw.

4. Gary poured a little more than $\frac{1}{2}$ a glass of milk.
Name a fraction that might tell how much milk that is.

5. Use a copy of this number line.
Estimate to place a fraction:
a) between 0 and $\frac{1}{2}$, but closer to 0
b) between $\frac{1}{2}$ and 1, but closer to $\frac{1}{2}$



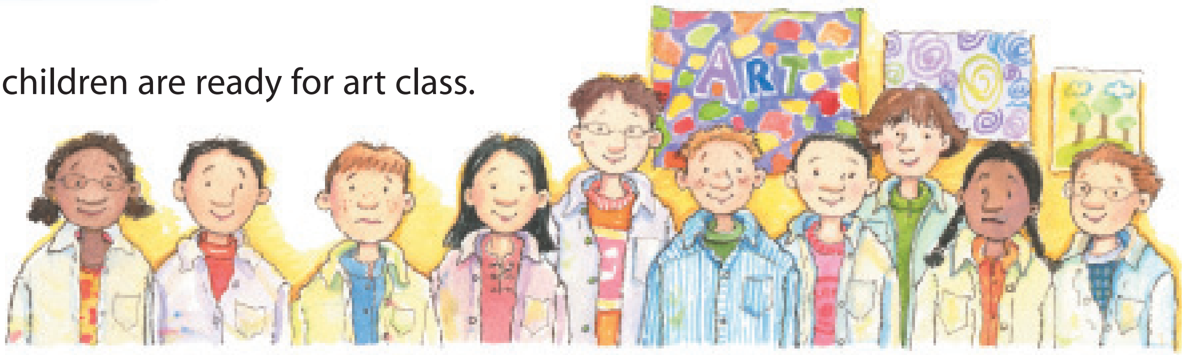
Reflect

Write two different fractions close to 0.
Use paper strips to show which fraction is closer to 0.

LESSON 3

Exploring Fractions of a Set

Ten children are ready for art class.



What fraction of the group is girls?
What fraction of the group is wearing a striped shirt?
What other fractions can you use to describe the children?

Explore

You will need 2 colours of counters and a bag.

Put 10 counters of each colour in a bag.

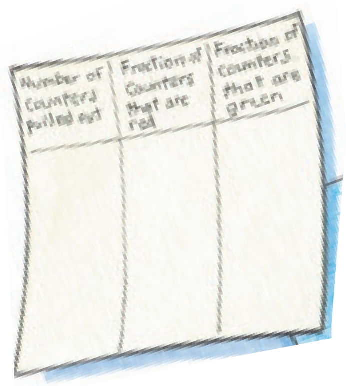
➤ Take out a handful of counters.

➤ Use a chart.
Record fractions to describe the set of counters.

➤ Return the counters.

➤ Record your work.

Repeat the activity 5 times.



Show *and* Share

Talk with your partner.
Tell how you knew what fractions to record for each set.

Connect

To find a fraction of a set, start by counting.

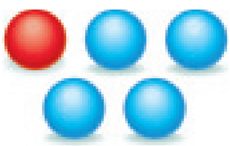
- There are 6 stars.
  5 of the 6 stars are yellow.
  $\frac{5}{6}$ of the stars are yellow.

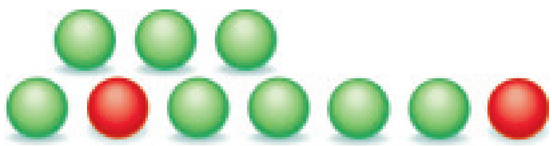
- There are 12 spaces in the paint tray.
  8 of the 12 spaces have paint.
  $\frac{8}{12}$ of the spaces have paint.
  $\frac{4}{12}$ of the spaces are empty.

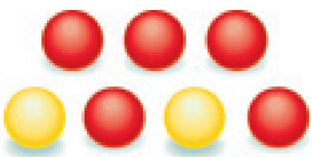
Practice

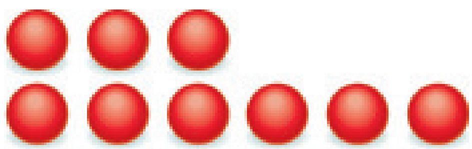
Use counters when they help.

1. What fraction of each set is red?

a) 

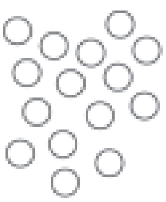
b) 

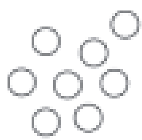
c) 

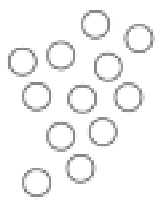
d) 

2. Draw your own set of counters.
Name the fractions in the set.

3. Copy each set of counters.
Shade the counters to show each fraction.

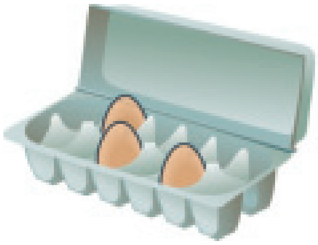
a) Show $\frac{7}{15}$. 

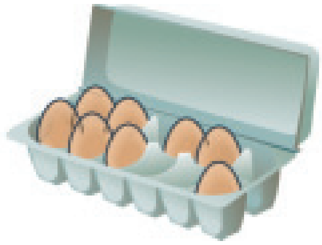
b) Show $\frac{8}{8}$. 

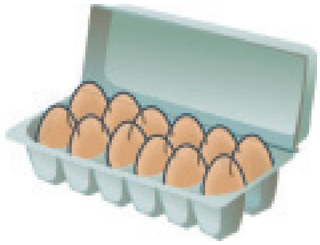
c) Show $\frac{1}{12}$. 

4. Write a fraction to tell what part of each set in question 3 is *not* shaded.

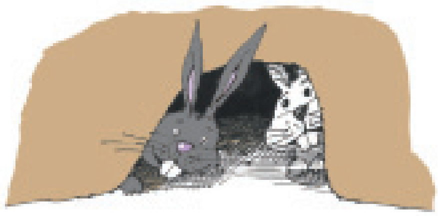
5. What fraction of eggs are left in each carton?
What fraction of eggs have been used?

a) 

b) 

c) 

6. Joe has 5 rabbits.
One-fifth is white.
The rest is black.
   a) How many rabbits are white?
   b) How many rabbits are black?



7. Jordie has 3 pairs of black pants and 2 pairs of red pants.
What fraction of Jordie's pants are red?

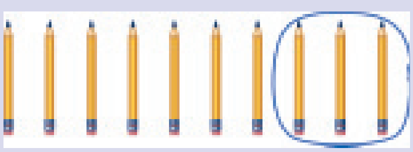
8. Print your first name.
   a) What fraction of the letters in your first name are vowels?
   b) What fraction of the letters are consonants?

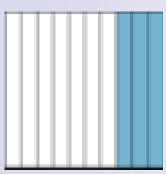
9. Louella had 2 black caps and 2 red caps.
   a) What fraction of her caps were red?
   b) Louella buys another cap.
   What fraction of her caps might be red now?
   Show your work.

10. Describe a situation in which you might use a fraction of a set.

Reflect

Explain why both pictures show $\frac{3}{10}$.

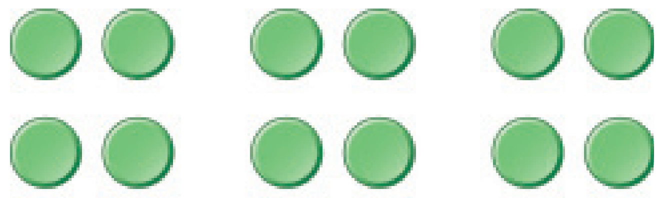




LESSON 4

Finding a Fraction of a Set

Here is one way to arrange 12 counters to make equal groups. How many other ways can you find?



3 equal groups of 4
Each group is $\frac{1}{3}$ of 12.

Explore

You will need:

- 25 two-colour counters
- 8 fraction cards

You will use the counters to model a fraction of a set.

➤ Shuffle the cards.
Put them face down in a pile.

➤ Take turns.
One person takes a fraction card.
Do not show the card.

➤ Count out the counters you need to match your card.
Place all the counters red side up.
Turn some groups of counters yellow side up to show your fraction.

➤ Have your partner tell you the fraction.

➤ Continue until you have used all the cards.

$\frac{3}{8}$ of 16

$\frac{4}{5}$ of 10

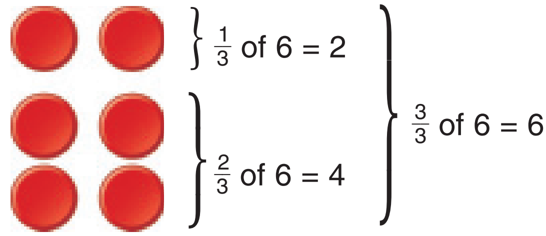
Show *and* Share

Tell the class about your strategy.
How did you know how many equal groups to make?

Lesson Focus | Represent fractions of a set using materials, pictures, and symbols.

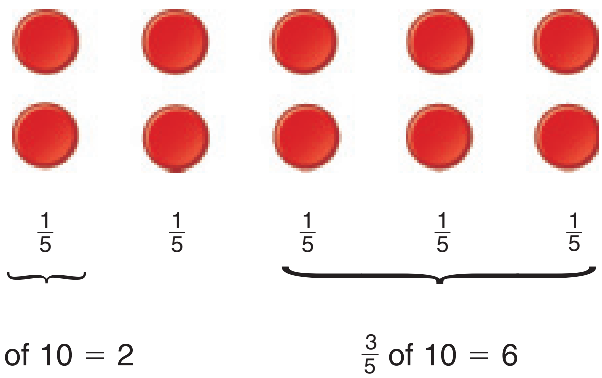
Connect

Fractions can show equal parts of a set.



Here is a way to find $\frac{3}{5}$ of 10.

The denominator tells us we are counting fifths. Divide 10 counters into 5 equal groups to show fifths.



Practice

Use counters in questions 1 to 3.
Find the fraction of each set.

1. **a)** $\frac{1}{4}$ of 8 **b)** $\frac{2}{4}$ of 8 **c)** $\frac{3}{4}$ of 8

2. **a)** $\frac{1}{3}$ of 12 **b)** $\frac{2}{3}$ of 12 **c)** $\frac{3}{3}$ of 12

3. **a)** $\frac{2}{8}$ of 16 **b)** $\frac{4}{10}$ of 20 **c)** $\frac{3}{6}$ of 12

4. Draw a picture to show the fraction of each set.
a) $\frac{2}{5}$ of 10 **b)** $\frac{3}{4}$ of 16 **c)** $\frac{5}{5}$ of 10

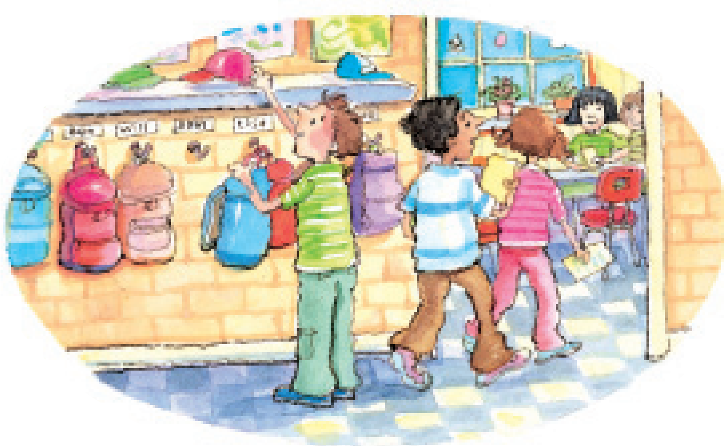
5. Find:
a) $\frac{1}{2}$ of 10 **b)** $\frac{3}{4}$ of 12 **c)** $\frac{1}{5}$ of 5

6. Print the name of the town or region where you live.
Use fractions to describe the letters in the name.

7. The pie shop sold 16 pies.
One-half of them were apple pies.
One-fourth of them were blueberry pies.
How many pies were not apple or blueberry?
Show your work.

8. 5 is $\frac{1}{4}$ of a set.
How many are in the set?

9. There are 10 boys in a class.
Two-fifths of the class are boys.
How many students are in the class?
How do you know?



10. When is $\frac{1}{2}$ of a set less than $\frac{1}{3}$ of another set?
When is it more?
Draw pictures to show your ideas.

11. When is $\frac{1}{4}$ of a group of children *not* equal to $\frac{1}{4}$ of another group of children?
Use pictures, numbers, and words to explain your thinking.

Reflect

When might you want to find a fraction of a set outside the classroom?

LESSON 5

Relating Fractional Parts of Different Wholes and Sets

Explore

You will need Cuisenaire rods or strips of coloured paper.

➤ Use the orange rod as one whole.
Find a rod that shows $\frac{1}{2}$ of the orange rod.
Draw a picture to record your work.

Find other pairs of rods so that one rod is $\frac{1}{2}$ of the other rod.
Draw pictures to record your work.

Compare the rods that represent one-half.
Compare the rods that represent one whole.
What do you notice?

➤ Repeat the activity for:
- pairs of rods that show $\frac{1}{3}$ of one whole.
- pairs of rods that show $\frac{1}{4}$ of one whole.

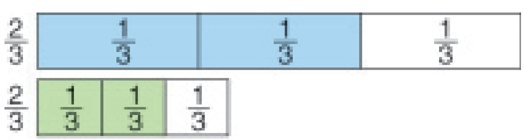
Show *and* Share

Share your work with another pair of students.
Explain how you chose the rods. What did you find out about the size of a fraction in relation to the size of the whole?

Connect

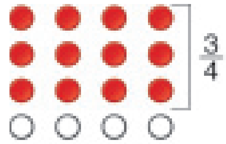
When 2 wholes have different sizes, the same fraction of the whole is different for each whole.

➤ Show $\frac{2}{3}$ of each paper strip.

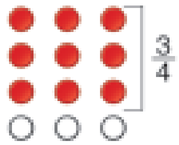


Two-thirds of the long strip is greater than $\frac{2}{3}$ of the short strip. The longer the whole, the greater the length that represents $\frac{2}{3}$

➤ Show $\frac{3}{4}$ of 16 and $\frac{3}{4}$ of 12.



$\frac{3}{4}$ of 16 counters are 12 counters.



$\frac{3}{4}$ of 12 counters are 9 counters.

$\frac{3}{4}$ of 16 counters are greater than $\frac{3}{4}$ of 12 counters.
The greater the number of counters, the greater the number that represents $\frac{3}{4}$

Practice

1. Use a 12-cm strip and a 6-cm strip.
   Fold and colour each strip to show $\frac{1}{6}$.
   Which strip shows a longer length that represents $\frac{1}{6}$?

2. Use a 9-cm strip and a 15-cm strip.
   Fold and colour each strip to show $\frac{2}{3}$.
   Which strip shows a longer length that represents $\frac{2}{3}$?

3. Draw a set of 20 apples and a set of 15 apples.
   Colour $\frac{2}{5}$ of each set of apples red.
   In which set does $\frac{2}{5}$ represent a greater amount? Explain.

4. Draw a picture to show:
   a) $\frac{2}{3}$ of one pie is greater than $\frac{2}{3}$ of another pie
   b) $\frac{3}{4}$ of one group of fish is less than $\frac{3}{4}$ of another group of fish

Reflect

What strategies help you compare the same fraction of two different sets?

LESSON 6

Strategies Toolkit

Explore

Nawar had 24 stickers.
He kept $\frac{1}{6}$ of the stickers
and divided the rest equally among his 5 friends.
How many stickers did each friend receive?

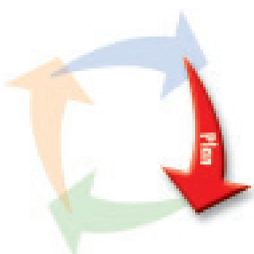
Show *and* Share

Describe how you solved this problem.

Connect

Kalpana had 40 prizes to award at the school fair.
She put $\frac{1}{4}$ of the prizes in the raffle.
She divided the rest equally among the 6 races.
How many prizes were there for each race?

What do you know?
- There are 40 prizes.
- The raffle used $\frac{1}{4}$ of the 40 prizes.
- The rest of the prizes were for the winners of the 6 races.

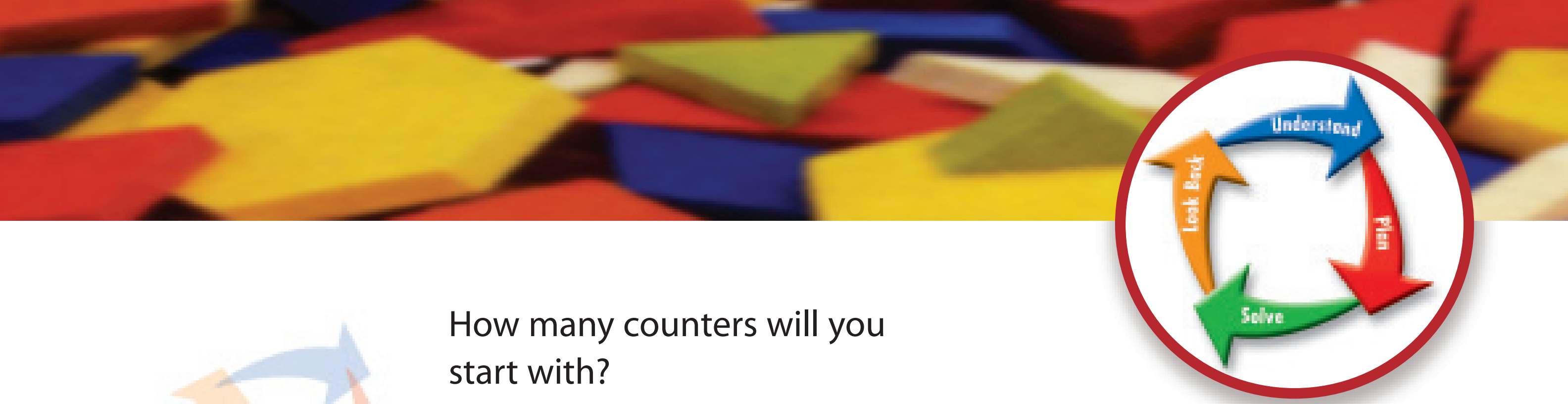


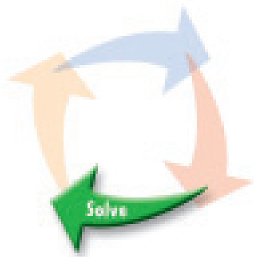
Think of a strategy to help you solve the problem.
- You can **use a model**.
- Use counters to represent the prizes.

Strategies

- Make a table.
- Use a model.
- Draw a picture.
- Solve a simpler problem.
- Work backward.
- Guess and test.
- Make an organized list.
- Use a pattern.

 Lesson Focus | Interpret a problem and select an appropriate strategy.





How many counters will you start with?
Remove the counters for the raffle.
How many counters are left?
Arrange them to show the prizes for the 6 races.
How many prizes are there for each race?

How could you solve this problem another way?
Try it, and use your answer to check your work.

Practice

Choose one of the
Strategies

1. Gabriella bought 20 batteries.
She put 2 batteries in her radio.
Her 3 brothers divided the rest equally.
How many did each brother receive?

2. Ms. Logan had gel pens to award after BINGO.
She gave 4 to Tip, and said that he had $\frac{2}{6}$ of them.
How many gel pens did Ms. Logan have to start?

3. Mabel coloured a rectangular sheet of paper $\frac{1}{8}$ purple, $\frac{1}{2}$ blue, and the rest yellow.
What fraction of the paper is yellow?

Reflect

How can counters help you solve fraction problems?
Use words, pictures, or numbers to explain.

LESSON 7

Comparing and Ordering Unit Fractions

Explore

Use Pattern Blocks to explore ways to compare fractions.

Use the yellow Pattern Block as 1 whole.
Which fraction in each pair is greater?

$\frac{1}{6}$ and $\frac{1}{1}$ $\frac{1}{2}$ and $\frac{1}{6}$

$\frac{1}{3}$ and $\frac{1}{2}$ $\frac{1}{6}$ and $\frac{1}{3}$

$\frac{1}{1}$ and $\frac{1}{3}$ $\frac{1}{2}$ and $\frac{1}{1}$

Show *and* Share

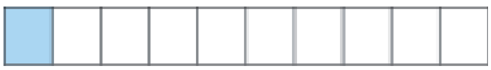
With your partner, talk about the ideas you used to choose your answers.
Record your work.

 LESSON FOCUS | Compare and order unit fractions.

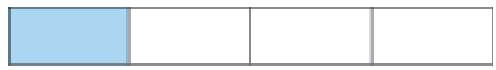
Connect

➤ A fraction with a numerator of 1 is a **unit fraction**.
$\frac{1}{2}$, $\frac{1}{10}$, and $\frac{1}{1}$ are unit fractions.

➤ With different unit fractions, the equal parts of the whole have different sizes.



$\frac{1}{10}$ ← 10 equal parts in the whole



$\frac{1}{4}$ ← 4 equal parts in the whole

Tenths are smaller than fourths.
So, $\frac{1}{10} < \frac{1}{4}$

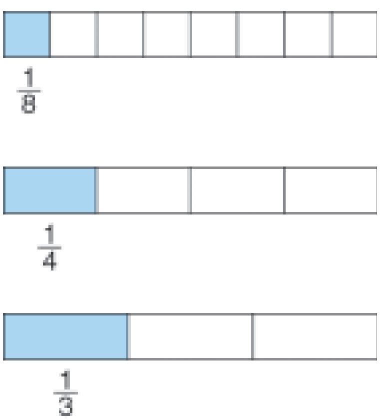
The more equal parts there are, the smaller the parts are.

➤ Order these unit fractions from least to greatest:

$$\frac{1}{8}, \frac{1}{3}, \frac{1}{4}$$

- One-eighth is the least because eighths are smaller than thirds and fourths.
- One-third is the greatest because thirds are greater than fourths.
- From least to greatest: $\frac{1}{8}, \frac{1}{4}, \frac{1}{3}$

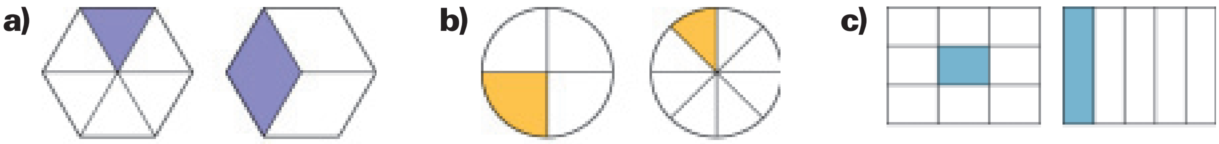
You can draw pictures to check your thinking.



Practice

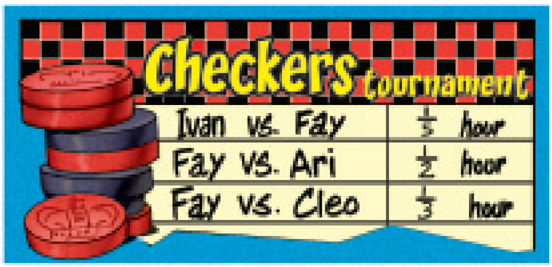
1. Look at each pair of shapes.
Compare the fractional parts that are shaded.
Write a fraction sentence using $<$, $>$, or $=$.

a) **b)** **c)**



2. Draw pictures to show which is greater.
a) $\frac{1}{2}$ or $\frac{1}{6}$ **b)** $\frac{1}{2}$ or $\frac{1}{4}$ **c)** $\frac{1}{3}$ or $\frac{1}{4}$
d) $\frac{1}{1}$ or $\frac{1}{8}$ **e)** $\frac{1}{3}$ or $\frac{1}{2}$ **f)** $\frac{1}{10}$ or $\frac{1}{5}$

3. **a)** Which pair of students had the longest checkers game?
b) Which had the shortest game?
How do you know?



4. Use four 12-cm strips of paper.
Show halves on one strip.
Show sixths on one strip.
Show quarters on one strip.
Show thirds on one strip.
Order these fractions from greatest to least: $\frac{1}{2}, \frac{1}{6}, \frac{1}{4}, \frac{1}{3}$
Show your work.

5. Order these fractions from greatest to least.
a) $\frac{1}{7}, \frac{1}{9}, \frac{1}{4}$ **b)** $\frac{1}{2}, \frac{1}{12}, \frac{1}{8}$ **c)** $\frac{1}{10}, \frac{1}{14}, \frac{1}{16}$ **d)** $\frac{1}{5}, \frac{1}{8}, \frac{1}{9}$

6. When can $\frac{1}{3}$ give you a bigger piece than $\frac{1}{2}$?
Draw diagrams to explain.

Reflect

What strategies can you use to compare unit fractions?

At Home

Look in the kitchen, the bathroom, or the laundry area. Where do you and your family use fractions at home?

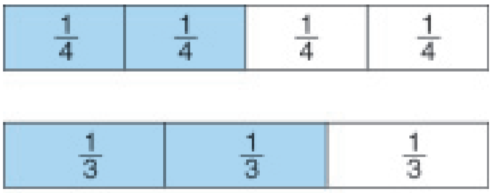
LESSON 8

Comparing and Ordering Fractions with the Same Numerator or Denominator

Explore

You will need 4 paper strips each 20 cm long.

➤ Fold and colour strips to show each fraction.
$\frac{2}{4}, \frac{2}{8}, \frac{2}{3}, \frac{2}{6}$



➤ Compare the $\frac{2}{4}$ strip and the $\frac{2}{3}$ strip.
Which fraction is greater?
How do you know?

➤ Continue to compare pairs of strips.
Record your findings using $>$ or $<$.

Show *and* Share

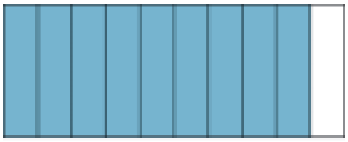
Talk with your partner about the pairs of fractions.
Which of the 4 fractions is least?
Which is greatest?
How do you know?

Lesson Focus | Compare and order fractions with the same numerator or denominator.

Connect

➤ Different fractions of the same whole may have the same denominator. Then, the parts being counted have the same size.

$\frac{3}{10}$ ← Tenths are counted.



$\frac{9}{10}$ ← Tenths are counted.

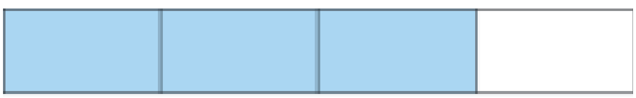
The fewer the parts, the smaller the fraction
So, $\frac{3}{10} < \frac{9}{10}$

➤ Here is one way to order these fractions with the same denominator:

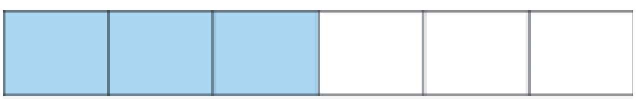
$\frac{3}{8}, \frac{7}{8}, \frac{2}{8}$

- $\frac{7}{8}$ is the greatest because it has the most parts.
- $\frac{2}{8}$ is the least because it has the fewest parts.
- From greatest to least: $\frac{7}{8}, \frac{3}{8}, \frac{2}{8}$

➤ Different fractions of the same whole may have the same numerator but different denominators. Then, the parts being counted have different sizes.



$\frac{3}{4}$ ← Fourths are counted.

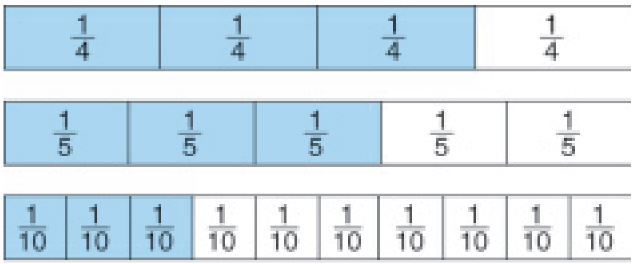


$\frac{3}{6}$ ← Sixths are counted.

The bigger the parts, the greater the fraction
So, $\frac{3}{4} > \frac{3}{6}$

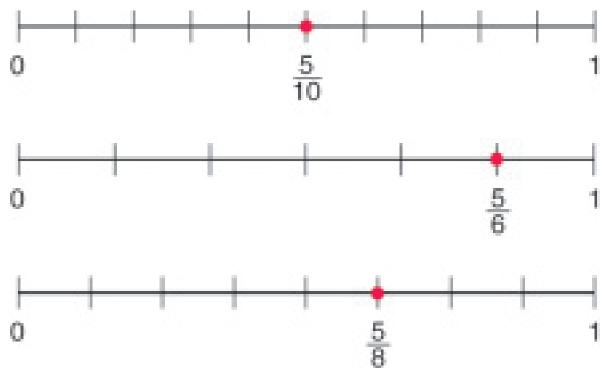
➤ Here are 3 ways to compare and order fractions with the same numerator.

- Order $\frac{3}{5}$, $\frac{3}{10}$, and $\frac{3}{4}$ from greatest to least.
  Use strips of paper with the same length.
  Fold and colour to show each fraction.
  Line up the strips.



The greatest fraction is the strip with the longest coloured part.
From greatest to least: $\frac{3}{4}$, $\frac{3}{5}$, $\frac{3}{10}$

- Order $\frac{5}{10}$, $\frac{5}{6}$, and $\frac{5}{8}$ from least to greatest.
  Draw number lines with the same length.



$\frac{5}{10}$ is to the left of $\frac{5}{8}$.

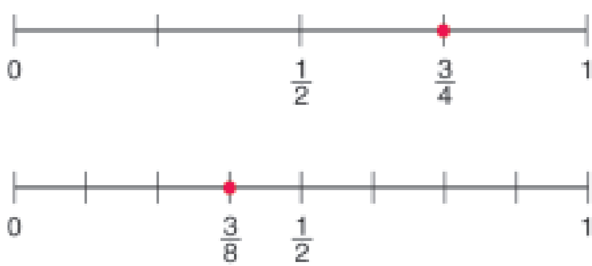
$\frac{5}{8}$ is to the left of $\frac{5}{6}$.
From least to greatest: $\frac{5}{10}$, $\frac{5}{8}$, $\frac{5}{6}$

- Compare $\frac{3}{4}$ and $\frac{3}{8}$.
  Use number lines and the benchmarks 0, $\frac{1}{2}$, and 1.

  $\frac{3}{8}$ is between 0 and $\frac{1}{2}$.

  $\frac{3}{4}$ is between $\frac{1}{2}$ and 1.

  So, $\frac{3}{8} < \frac{3}{4}$



Practice

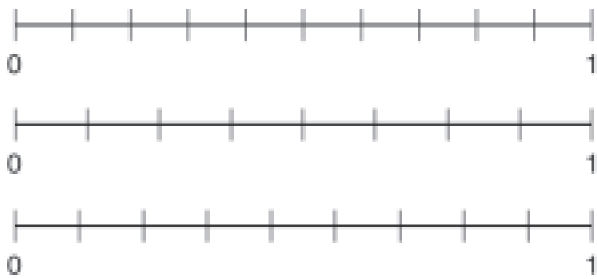
1. Use two 15-cm strips.
   Fold and colour one strip to show $\frac{2}{3}$.
   Fold and colour the other strip to show $\frac{2}{5}$.
   Which fraction is greater, $\frac{2}{3}$ or $\frac{2}{5}$?

2. Colour and fold two 16-cm strips to show $\frac{3}{4}$ and $\frac{3}{8}$.
   Use $>$ or $<$ to compare the fractions.

3. Draw a 12-cm number line.
   Label the number line with the benchmarks 0, $\frac{1}{2}$, and 1.
   Estimate to place $\frac{2}{3}$ and $\frac{2}{6}$ on the number line.
   Which fraction is greater? How do you know?

4. Use three 24-cm strips.
   Fold and colour the strips to show $\frac{3}{4}$, $\frac{3}{8}$, and $\frac{3}{6}$.
   Order the fractions from greatest to least.

5. Use a copy of these 3 number lines.
   Order $\frac{6}{10}$, $\frac{6}{8}$, and $\frac{6}{9}$ from least to greatest.



6. Olivia and Sayed each bought the same fruit bar.
   Olivia ate $\frac{2}{3}$ of her bar.
   Sayed ate $\frac{2}{4}$ of his bar.
   Use pictures, numbers, or words to show who ate more.

7. Jordan and Laci each has 12 coloured pencils.
   Jordan sharpened $\frac{3}{4}$ of his pencils.
   Laci sharpened $\frac{3}{6}$ of her pencils.
   Who sharpened more pencils? How do you know?
   Show your work.

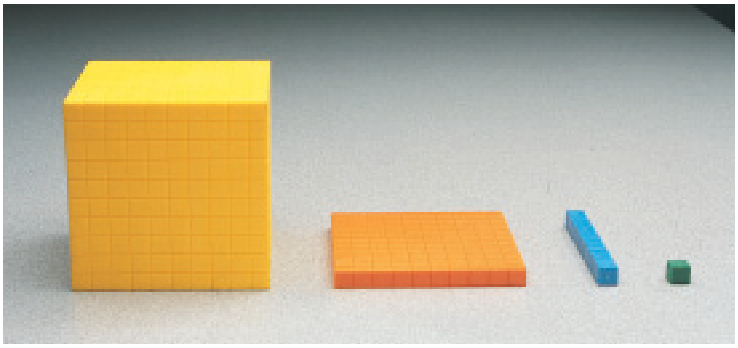
Reflect

Which strategy do you prefer to compare fractions?
Why?

LESSON 9

Exploring Tenths

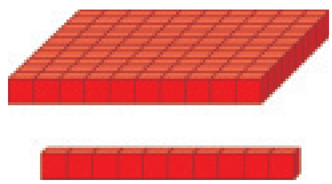
You have used Base Ten Blocks to model whole numbers.



What if you could use Base Ten Blocks to model fractions?

Explore

You will need Base Ten Blocks and grid paper.
Suppose a flat represents 1 whole.
What does a rod represent?



Use Base Ten Blocks to show these numbers.

$\frac{6}{10}$ $\frac{9}{10}$ $\frac{3}{10}$

Record your work on grid paper.

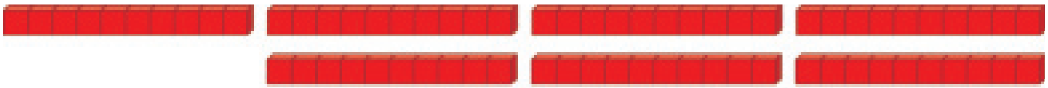
Show *and* Share

Share your work with another student.
Did you draw the same pictures for each number?
If you did not, who is correct?
Can both of you be correct? Explain.
What do you think a rod represents?

LESSON FOCUS | Explore fractions and decimals with tenths.

Connect

Here is one way to model $\frac{7}{10}$.



Any number in tenths can be written as a fraction or a **decimal**.
To write a fraction as a decimal, use a **decimal point**.

$\frac{7}{10}$ is the same as 0.7

This is the decimal point.
Since $\frac{7}{10}$, or 0.7, are less than 1 whole,
we write 0 before the decimal point
to show there is no whole number part.

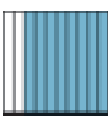
You can use a place-value chart to show a decimal.

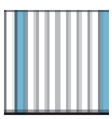
Ones	Tenths
0	7

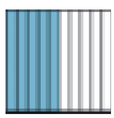
The decimal point is between the ones place and the tenths place.

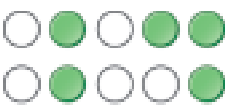
Practice

1. Write a fraction and a decimal for the coloured part of each picture.

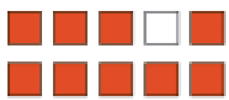
a) 

b) 

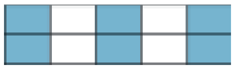
c) 

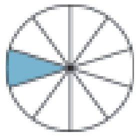
d) 

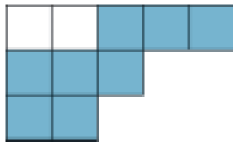
e) 

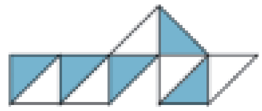
f) 

2. Write a fraction and a decimal for the coloured part of each picture.

a) 

b) 

c) 

d) 

3. Draw a picture for each fraction.
Say the fraction, then write it as a decimal.

a) $\frac{4}{10}$ **b)** $\frac{7}{10}$ **c)** $\frac{9}{10}$

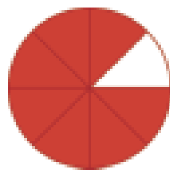
4. Draw a picture for each decimal. Write the decimal as a fraction.

a) 0.1 **b)** 0.8 **c)** 0.2

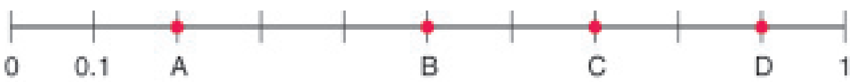
5. Write each number as a fraction and as a decimal.

a) nine-tenths **b)** three-tenths **c)** one-tenth

6. Alicia said 0.7 of the circle are red.
Is she correct? Explain how you know.



7. Write a decimal and a fraction for each letter on the number line.



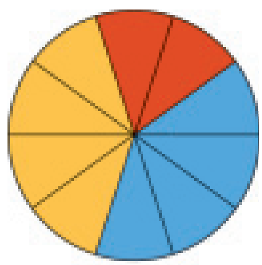
8. Look at the circle. Is each statement true or false? How do you know?

a) Two-tenths of the circle are red.

b) 0.3 of the circle are blue.

c) $\frac{6}{10}$ of the circle are not yellow.

d) 0.8 of the circle are blue or red.



Reflect

Why is the decimal point important?
Use words, pictures, or numbers to explain.

LESSON 10

Exploring Hundredths

Explore

You will need Base Ten Blocks and grid paper.

Suppose a flat represents 1 whole, and a rod represents $\frac{1}{10}$.

What does a unit cube represent?

Use Base Ten Blocks to show these numbers.

$\frac{10}{100}$ $\frac{75}{100}$ $\frac{3}{10}$ $\frac{21}{100}$ $\frac{6}{100}$

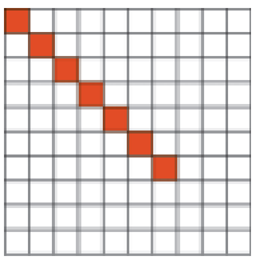
Record your work on grid paper.

Show *and* Share

Share your work with another pair of students. How did you find out what a unit cube represents?

Connect

➤ This grid is divided into 100 equal squares. Each square is **one-hundredth** of the grid. Seven-hundredths of the grid are red.



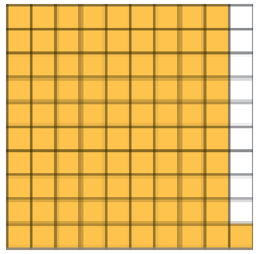
We can write seven-hundredths as a fraction or as a decimal.

$\frac{7}{100}$ is the same as 0.07

This zero shows there are no whole number parts.

This zero shows there are no tenths.

Ninety-one hundredths of this grid are yellow.
We write: $\frac{91}{100}$, or 0.91

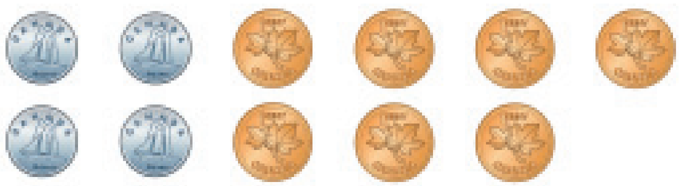


➤ We can use a place-value chart to show a decimal with hundredths.

We say: zero and nine-hundredths
We say: zero and sixty-hundredths

Ones	Tenths	Hundredths
0	0	9
0	6	0

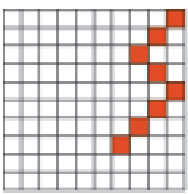
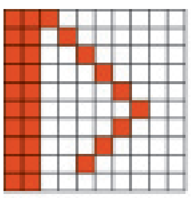
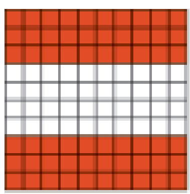
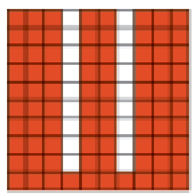
➤ We can use decimals to write parts of one dollar.
1 dollar = 100 cents
So, 1 cent = $\frac{1}{100}$ dollar, or 0.01 dollar



Here are 47 cents.
47 cents = $\frac{47}{100}$ dollar
We write: 47¢ or $0.47

Practice

1. Write a fraction and a decimal for the coloured part of each picture.

a)  **b)**  **c)**  **d)** 

2. Colour a hundredths grid to show each number.

a) $\frac{2}{100}$ **b)** $\frac{35}{100}$ **c)** 0.05 **d)** 0.18

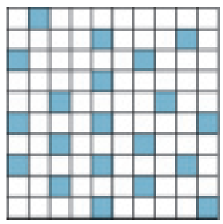
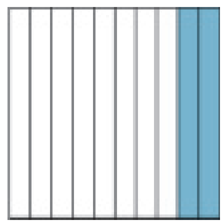
3. Say each decimal, then model it with Base Ten Blocks.
Record your work on grid paper.
Label each picture with a fraction.
a) 0.40 **b)** 0.31 **c)** 0.09 **d)** 0.02

4. Say each fraction, then write it as a decimal.
a) $\frac{17}{100}$ **b)** $\frac{60}{100}$ **c)** $\frac{39}{100}$ **d)** $\frac{7}{100}$

5. Write as a decimal.
a) six-hundredths **b)** thirty-nine hundredths
c) five-hundredths **d)** fourteen-hundredths

6. Say each decimal, then write it as a fraction.
a) 0.03 **b)** 0.16 **c)** 0.10 **d)** 0.54

7. Write a fraction and a decimal for the coloured part of each grid.
What do you notice about the coloured parts? Explain.
Show your work.

8. Model each amount with dimes and pennies.
Draw pictures to show your work.
a) \$0.46 **b)** \$0.08 **c)** \$0.21 **d)** \$0.03

9. Write each amount as a decimal.
a) 58¢ **b)** 9 cents **c)** 73 cents **d)** 14¢

10. Write each amount in words.
a) \$0.27 **b)** \$0.18 **c)** \$0.70 **d)** \$0.01

11. Explain the meaning of each digit in each decimal.
a) 0.11 **b)** 0.77 **c)** 0.44 **d)** \$0.22

12. Describe a situation in which you might use hundredths in everyday life.

Reflect

Why are the zeros important in the decimals 0.5 and 0.05?

LESSON 11

Equivalent Decimals

Explore

You will need Base Ten Blocks and hundredths grids.
Model each pair of decimals in as many ways as you can.

0.3 and 0.30 0.6 and 0.60

0.8 and 0.80 0.5 and 0.50

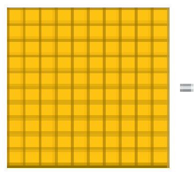
Record your work by colouring hundredths grids.

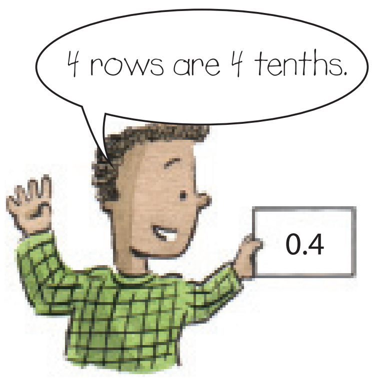
Show and Share

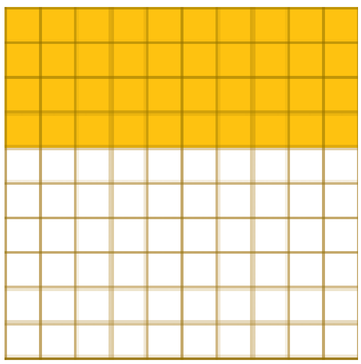
Share your work with another pair of students.
Discuss what you discovered about the pairs of decimals.

Connect

One row of this hundredths grid is one-tenth of the grid.
Each small square is one-hundredth of the grid.





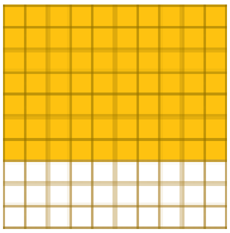


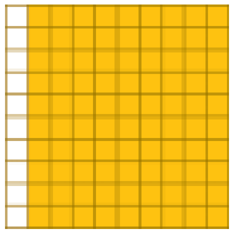
Both 0.4 and 0.40 name the shaded part of the grid.
So, 0.4 = 0.40
Decimals that name the same amount are called
equivalent decimals.

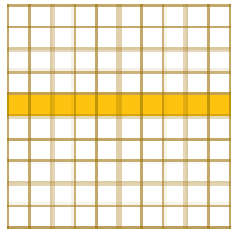
LESSON FOCUS | Identify equivalent decimals.

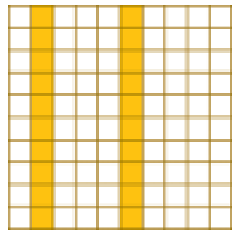
Practice

1. Write two equivalent decimals that name the shaded part of each grid.

a) 

b) 

c) 

d) 

2. Colour hundredths grids to show each number.
Write an equivalent decimal.
a) 0.20 **b)** 0.9 **c)** 0.70 **d)** 0.1

3. Write an equivalent decimal for each number.
a) 0.5 **b)** 0.80 **c)** 0.30 **d)** 0.6 **e)** 0.4
f) 0.70 **g)** 0.90 **h)** 0.2 **i)** 0.50 **j)** 0.10

4. Find the equivalent decimals in each group.
a) 0.5 0.05 0.50 **b)** 0.70 0.7 0.07
c) 0.8 0.08 0.80 **d)** 0.04 0.40 0.4

5. Which bag of onions is the better buy?
Explain how you know.

6. A student said that 0.40 is greater than 0.4 because 40 is greater than 4. Was the student correct? Use words, pictures, or numbers to explain.

7. Use dimes and pennies to show how many pennies are equal to 3 dimes.
Draw a picture to show your thinking.

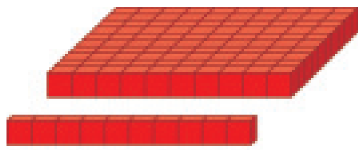
Reflect

When would you use tenths and hundredths outside the classroom?

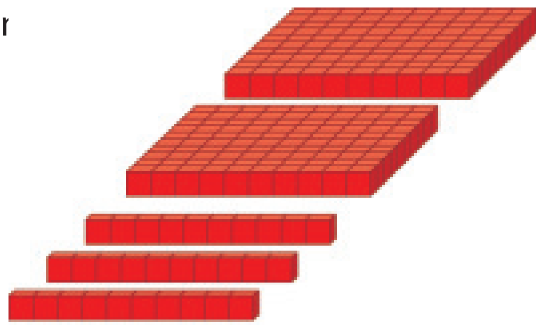
LESSON 12

Adding Decimals to Tenths

The Base Ten flat represents 1 whole.
The rod represents one-tenth, or 0.1.



These blocks represent two and three-ter
We write: 2.3
We say: two and three-tenths



Explore

Ty enjoys hiking.
He keeps track of his weekend hiking distances.
Estimate how far Ty walked each weekend.
Find how far Ty walked each weekend.
Record your work.

Show *and* Share

Show how you solved the problem.
What strategies helped you?
Share your ideas to start a class list.

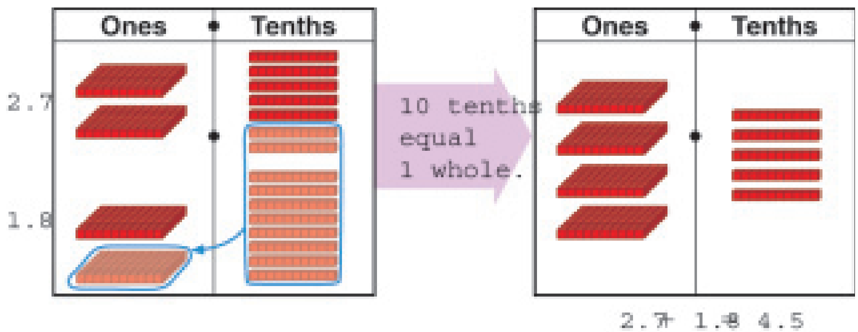
Connect

Another weekend, Ty hiked 2.7 km and 1.8 km.

To estimate Ty's total distance, find a whole number close to each decimal.
2.7 is close to 3.
1.8 is close to 2.
3 + 2 = 5
Ty hiked approximately 5 km.

To add 2.7 + 1.8, use whole number strategies.

➤ Use Base Ten Blocks to add 2.7 + 1.8.



➤ Use place value to add 2.7 + 1.8.

Add the tenths:
15 tenths

$$\begin{array}{r} 2.\mathbf{7} \\ +\ 1.\mathbf{8} \\ \hline \end{array}$$

10 tenths equal 1 whole.
1 and 5 tenths

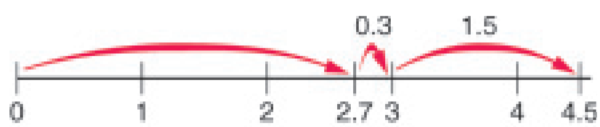
$$\begin{array}{r} {}^{1} \\ 2.7 \\ +\ 1.8 \\ \hline \mathbf{.5} \end{array}$$

Add the ones.

$$\begin{array}{r} \mathbf{1} \\ \mathbf{2}.7 \\ +\ \mathbf{1}.8 \\ \hline \mathbf{4}.5 \end{array}$$

➤ Use mental math. Move tenths to make one.

$$\begin{aligned} 2.7 + 1.8 &= \underbrace{2.7 + 0.3} + 1.5 \\ &= \quad 3.0 \quad + 1.5 \\ &= 4.5 \end{aligned}$$



Ty hiked 4.5 km.

Practice

1. Estimate each sum.
   a) 0.4 + 0.3   b) 1.4 + 0.4   c) 2.6 + 1.1   d) 3.2 + 2.9

2. Add. Use Base Ten Blocks to help you.
   a) 1.8 + 2.1   b) 0.7 + 4.6   c) 3.6 + 1.2   d) 4.7 + 1.9

3. Will each sum be greater or less than 3? How do you know?
   a) 2.1 + 0.4   b) 2.3 + 0.9   c) 1.3 + 1.6   d) 1.2 + 2.1

Use the map below for questions 4 to 6.

4. Use the map to find the shortest distances.

	From:	To:
a)	Miller's Landing	Jake's Point
b)	Elma	Pearl
c)	Greenville	Elma
d)	Jake's Point	Port Baker
e)	Port Baker	Pearl

5. Franca travelled 6.8 km from one town to another town.
Where might Franca have travelled?
Show your work.

6. Make up a story problem that uses the map.
Solve your problem.

7. At 7:00 A.M., the temperature in Gander was 12.5°C.
By noon, the temperature had risen by 4.9°C.
What was the temperature at noon?

8. The Hon family buys fruit at the market.
Last Saturday, the family bought 2.6 kg of apples and 1.8 kg of bananas.
How much fruit did the family buy in total?

9. Alex's laptop computer has a mass of 2.3 kg.
The mass of the carrying case is 0.8 kg.
What is the total mass of the laptop and carrying case?

10. Marie-Claire rode her scooter 1.5 km to the store.
On the way home, she took a different route that was 0.7 km longer.
What was the total distance Marie-Claire rode?
How do you know?

Reflect

Explain how adding decimals is like adding whole numbers.
How is it different?

At Home

Look at the nutrition information on a cereal box.
How are decimals used?
Write about what you notice.

LESSON 13

Subtracting Decimals to Tenths

Explore

Liak is a long distance swimmer.
Her coach keeps track of her progress.

Liak's Progress Chart		
Class	Tuesday	Thursday
Week 1	1.4 km	2.8 km
Week 2	3.9 km	5.7 km

For each week, estimate how much farther Liak swam on the second day.
Then, find how much farther Liak swam.

Record your work.

Show *and* Share

Show how you solved the problem.
What strategies helped you?
Share your ideas to start a class list.

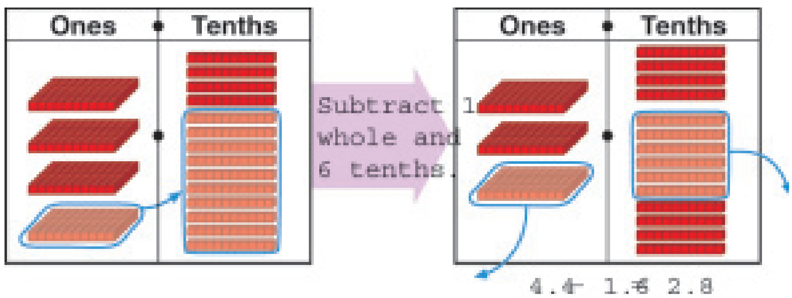
Connect

Suppose Liak swam 4.4 km on Thursday and 1.6 km on Tuesday.
How much farther did Liak swim on Thursday?

To estimate the distance:
4.4 is close to 4.
1.6 is close to 2.
$4 - 2 = 2$
Liak swam about 2 km farther on Thursday.

To subtract $4.4 - 1.6$, use whole number strategies.

➤ Use Base Ten Blocks to subtract.
Trade 1 whole for 10 tenths.

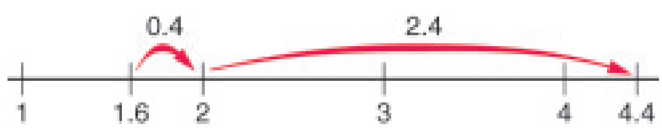


➤ Use place value to subtract.
Try to subtract the tenths.

You cannot take 6 tenths from 4 tenths.	Trade 1 whole for 10 tenths.	Subtract the tenths.	Subtract the ones.
$\begin{array}{r} 4.\mathbf{4} \\ -\ 1.\mathbf{6} \\ \hline \end{array}$	$\begin{array}{r} \overset{3}{\cancel{4}}.\overset{14}{\cancel{4}} \\ -\ 1.6 \\ \hline \end{array}$	$\begin{array}{r} \overset{3}{\cancel{4}}.\overset{\mathbf{14}}{\cancel{4}} \\ -\ 1.\mathbf{6} \\ \hline \mathbf{.8} \end{array}$	$\begin{array}{r} \overset{\mathbf{3}}{\cancel{4}}.\overset{14}{\cancel{4}} \\ -\ \mathbf{1}.6 \\ \hline \mathbf{2}.8 \end{array}$

➤ Use mental math. Think addition.

$1.6 + 0.4 = 2.0$
$2.0 + 2.4 = 4.4$
So, $4.4 - 1.6 = 0.4 + 2.4$
$4.4 - 1.6 = 2.8$



Liak swam 2.8 km farther on Thursday.

Practice

1. Subtract. Use different strategies.
   a) 5.3 − 2.1 b) 4.9 − 0.7 c) 3.6 − 1.9 d) 7.4 − 4.8

2. Subtract.

   a) $\begin{array}{r} 52.7 \\ -\,45.8 \\ \hline \end{array}$ b) $\begin{array}{r} 31.0 \\ -\ \ 5.7 \\ \hline \end{array}$ c) $\begin{array}{r} 9.6 \\ -\,2.7 \\ \hline \end{array}$ d) $\begin{array}{r} 25.1 \\ -\,12.2 \\ \hline \end{array}$

3. Grant had 6.5 m of ribbon. He used 4.9 m to wrap up a gift.
   How much ribbon does Grant have left?
   How do you know your answer is reasonable?

4. Giorgio grew a 3.4-kg pumpkin. Toni grew a 4.1-kg pumpkin.
   Whose pumpkin had the greater mass? How much greater was it?

5. The temperature at 9:00 P.M. was 15.4°C.
   At midnight, it was 12.5°C.
   What was the change in temperature?

6. Aimee adopted a puppy from the Humane Society.
   Its mass was 4.7 kg. At the first visit to the vet,
   the puppy had a mass of 5.4 kg.
   How much mass had the puppy gained?

7. Jan ran the 100-m dash in 14.8 s.
   The school record is 15.6 s.
   By how much did Jan beat the school record?

8. Use estimation.
   Is the difference between 1.8 and 0.5 greater than 1
   or less than 1?
   Show your work.

Reflect

You know several ways to subtract two decimals.
Which way do you prefer?
Use words, pictures, or numbers to explain.

LESSON 14

Adding and Subtracting Decimals to Hundredths

Money uses base ten with tenths and hundredths.

		
\$1.00 or \$1	\$0.10 or 10¢	\$0.01 or 1¢

Place value can help you read an amount of money.

Dollars (Ones)	Dimes (Tenths)	Pennies (Hundredths)
		

\$2.54 or two dollars and fifty-four cents

Explore

Suppose you have \$10.00 to spend.
What could you buy?
How much money would be left?

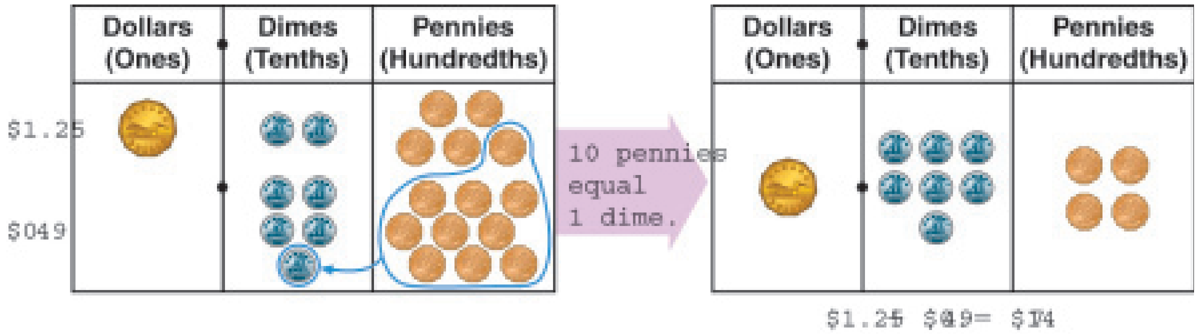
Show *and* Share

Compare your answers with a classmate's answers.
How did you decide what to buy?

Connect

Lakshi had $5.
She bought a fruit cup for $1.25 and water for $0.49.

➤ How much did Lakshi spend?
Use a place-value mat to add $1.25 + $0.49.



Lakshi spent $1.74.

➤ What is Lakshi's change from $5?

• You can count on.

$1.74, ... $1.75, ... $2.00, ... $3.00 ... $5.00
The change is $3.26.

• You can use place value and subtraction.

Line up the decimal points.	Trade $1 for 10 dimes. Trade 1 dime for 10 pennies.	Subtract the cents.	Subtract the dollars.
	9 4 $\cancel{10}$ $\cancel{10}$	4 9 10	4 9 10
$5.00	$\$\cancel{5}.\cancel{0}\cancel{0}$	$\$\cancel{5}.\cancel{0}\cancel{0}$	$\$\cancel{5}.\cancel{0}\cancel{0}$
− 1.74	− 1.74	− 1.**74**	− **1**.74
		.**26**	**3**.26

The change from a $5 bill is $3.26.

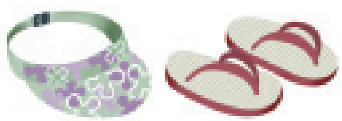
Practice

1. Find each sum. Use different strategies.
   a) \$2.86 + \$3.61 **b)** \$4.79 + \$3.18
   c) \$6.27 + \$3.04 **d)** \$7.29 + \$0.49

2. Add.
   a) $\begin{array}{r} \$5.31 \\ +\ 2.03 \\ \hline \end{array}$ **b)** $\begin{array}{r} \$4.11 \\ +\ 1.66 \\ \hline \end{array}$ **c)** $\begin{array}{r} \$6.23 \\ +\ 5.34 \\ \hline \end{array}$ **d)** $\begin{array}{r} \$5.60 \\ +\ 4.78 \\ \hline \end{array}$

3. Find each difference. Use different strategies.
   a) \$5.75 − \$2.51 **b)** \$7.37 − \$4.29
   c) \$8.25 − \$5.62 **d)** \$3.25 − \$0.18

4. What is the change from \$10 when you spend each amount?
   a) \$5.42 **b)** \$3.76 **c)** \$8.22 **d)** \$4.20

5. Look at the items below. Find the cost of each pair of items.
   a)
   
   b)
   
   c)
   

   d)
   

6. Look at the items above.
   a) About how much will all 5 beach items cost?
   b) About how much change will you get from \$25.00?
   c) Find the exact cost and your change.
   How close were your estimates?
   Show your work.

7. Use the Ice Cold Drinks menu.
   a) Ira bought a milkshake. How much change did he get from $5.00?
   b) Suppose Ira bought water instead of a milkshake.
   How much money would he save?
   c) Jerry used a $5 bill to pay for one drink.
   His change was $2.21.
   What drink did Jerry buy?
   How do you know?

8. Mei saved her allowance to go to the mall.
   She had $11.45 to spend.
   After two hours, Mei had spent $8.76.
   How much money did Mei have left?

9. Milo wants to buy some muffins.
   The cost is $5.95 plus tax. The tax is $0.36.
   Milo has $6.30.
   Does he have enough to buy the muffins?
   How do you know?

10. Hugh is a cashier.
    His cash register is out of pennies.
    Here is a customer's receipt.
    The customer pays with a $20 bill.
    Can Hugh make the correct change?
    Show your work.

THE GROCERY STORE	
potatoes	$2.87
bread	$1.14
butter	$2.99

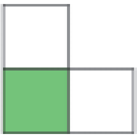
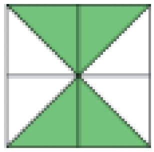
Reflect

You have learned two methods for making change.
When might you use each method?

Show What You Know

LESSON

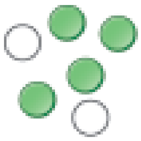
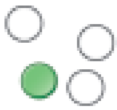
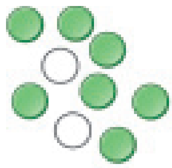
1 **1.** Write a fraction to tell what part of each figure is shaded.

a)  **b)**  **c)** 

2. Write a fraction to tell what part of each figure in question 1 is *not* shaded.

2 **3.** Name a fraction between 0 and $\frac{1}{2}$, but closer to 0.
Draw a picture to show the fraction.

3 **4.** Tell what fraction of each set is shaded.

a)  **b**  **c)** 

4 **5.** Draw a picture to show the fraction of each set.

a) $\frac{2}{10}$ of 20 stars **b)** $\frac{4}{4}$ of 8 eggs **c)** $\frac{3}{5}$ of 10 squares

5 **6.** Draw a picture to show that $\frac{3}{4}$ of one pizza is *not* equal to $\frac{3}{4}$ of another pizza.

7. Draw a picture to show when $\frac{1}{3}$ of a group of fish is *not* equal to $\frac{1}{3}$ of another group of fish.

7 **8.** Draw a number line 12 cm long.
Label the benchmarks 0, $\frac{1}{2}$, and 1.
Estimate to place $\frac{1}{6}$, $\frac{1}{3}$, and $\frac{1}{10}$ on the number line.
Order $\frac{1}{6}$, $\frac{1}{3}$, and $\frac{1}{10}$ from greatest to least.

8 **9.** Order these fractions from least to greatest.
Use any materials to help you.

$\frac{3}{4}$ $\frac{3}{8}$ $\frac{3}{5}$ $\frac{3}{10}$

9 10 **10.** Colour a hundredths grid to show each decimal.

a) 0.45 **b)** 0.09 **c)** 0.80 **d)** 0.3

LESSON

11 **11.** Write an equivalent decimal for each decimal.

a) 0.8 **b)** 0.20 **c)** 0.1 **d)** 0.60

12 13 **12.** Kim had 2.6 m of blue fabric and 1.6 m of yellow fabric.

a) How much fabric did Kim have altogether?

b) How much more blue fabric did Kim have?

12 13 **13.** Add or subtract. Use Base Ten Blocks to help you.

a) 4.6 + 4.3 **b)** 3.4 − 1.2 **c)** 2.8 + 3.9

d) 1.7 − 1.5 **e)** 5.1 + 0.9 **f)** 1.3 − 0.8

14 **14.** Imagine you have $10.00 to buy school supplies.

a) Choose 2 items you want to buy. About how much will they cost? About how much money would you have left?

b) Which two items could you *not* buy with $10.00? Explain.

UNIT 5 **Learning Goals**

- ✓ model, name, and record fractions of a whole and of a set
- ✓ compare and order fractions
- ✓ relate tenths and hundredths as decimals and fractions
- ✓ explore equivalent decimals
- ✓ use decimals to record money values
- ✓ add and subtract decimals and money
- ✓ identify everyday contexts in which fractions and decimals are used

Unit Problem

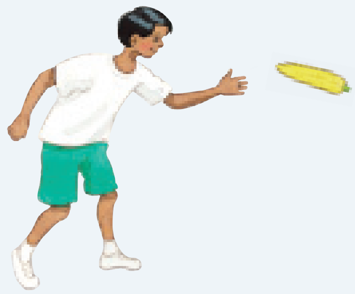
Spring Activities Day

You be the judge!
Here are the results for the top 3 students in each activity.

In the Egg Race, students had 3 minutes to carry the eggs, and fill the cartons. The winner was the person who filled the egg carton with the most eggs.

Egg Race

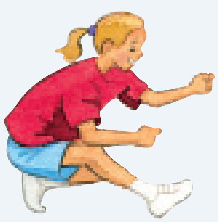
Name	Fraction of Carton Filled
Zachary	$\frac{5}{12}$
Wilma	$\frac{10}{12}$
Myles	$\frac{6}{12}$



In the Corn Cob Toss, students used an underhand throw to toss the corn cob as far as they could.
The winner was the person with the longest toss.

Corn Cob Toss

Name	Distance
Percy–1st	4.99 m
Misty–2nd	4.68 m
Joi–3rd	4.45 m



In the Duck Waddle, students walked like a duck around the playground.
The fastest person was the winner.

Duck Waddle

Name	Time
Maria–1st	29.8 s
Hunter–2nd	36.2 s
Thomas–3rd	45.3 s

Check List

Your work should show
- ✓ how you used fractions and decimals correctly to find your answers
- ✓ your answers clearly explained
- ✓ how you developed a new successful event
- ✓ mathematical language and symbols used correctly

Part 1

- Who won the Egg Race?
  Who came second? Third?
  How do you know?
- The results for the Corn Cob Toss were very close!
  What was the difference in the distances for 1st place and 2nd place?
  2nd place and 3rd place?
  How do you know?

Part 2

Make up a story problem about the Spring Activities Day results.
Solve your problem.

Part 3

What event would you plan for a Spring Activities Day?
How would you award the prizes?
Make up some examples to show what might happen.
Use fractions or decimals in your activity.
Explain your work.

Reflect on Your Learning

Look back at the Learning Goals.
Which goal do you understand well enough to be able to help a friend?
What would you do to help a friend?