October Math Pacing Guide
8th Grade

M.EE.8.NS.2.a - Express a fraction with a denominator of 100 as a decimal.

Learning Goal:

- Level 2-3 – Students will represent a fraction with a denominator of 10 as a decimal
- Level 1 – Students will recognize separateness

Essential Questions:

- How can I express a fraction as a decimal?

Vocabulary:

- decimal - in the base ten number system, a number that has a decimal point with digits after it.
- decimal point - a dot or point used to separate whole numbers from fractions.
- digit - one of the numbers from zero to nine.
- fraction - a representation of a division of a number; a part of a whole.
- hundredth - one part of one hundred equal parts; 0.01.
- number line - a line that shows all numbers placed in their correct positions.
- tenth - one of ten equal parts into which something is divided; 0.10.
- denominator – the part of a fraction that is below the line that functions as the divisor of the number.
- numerator – the number above the line in a common fraction showing how many parts indicated by the denominator are taken.

Mini-Map for M.EE.8.NS.2.a

Subject: Mathematics
The Number System (NS)
Grade: 8

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.8.NS.2.a Express a fraction with a denominator of 100 as a decimal.	**M.8.NS.2** Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2).

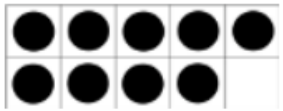
Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of "separateness" by recognizing objects that are not joined together. Communicate understanding of a set by recognizing a group of objects sharing an attribute.	Divide a set (e.g., 8 crayons) into two or more equal subsets (e.g., two subsets of 4 crayons). Demonstrate understanding of a unit fraction (e.g., 1/4) as the quantity formed by one part when a whole is partitioned into *n* (e.g., 4) equal parts.	Communicate understanding that a decimal point is a dot that separates the whole number from the fractional part of a number. Represent a fraction with a denominator of 10 as a decimal.	Represent a fraction with a denominator of 100 as a decimal (e.g., 52/100 as 0.52).	Compare two decimals to the tenths or hundredths place using symbols (i.e., =, <, >) to show that one is greater than, less than, or equal to the other.

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

Converting a fraction to a decimal requires a student to be able to recognize that two or more sets or groups of items exist. Work on this skill using a variety of sets. Help students recognize when items are grouped together into a set or separated out. As educators present a set, they label it (e.g., two balls, one marker, three CDs), count the items, label it again, and encourage students to use numerals to label and count the separate sets. Use tools like the ten-frame to point out whole and parts (e.g., a row of 5 dots and a row of 4 dots are parts or subsets of 9).

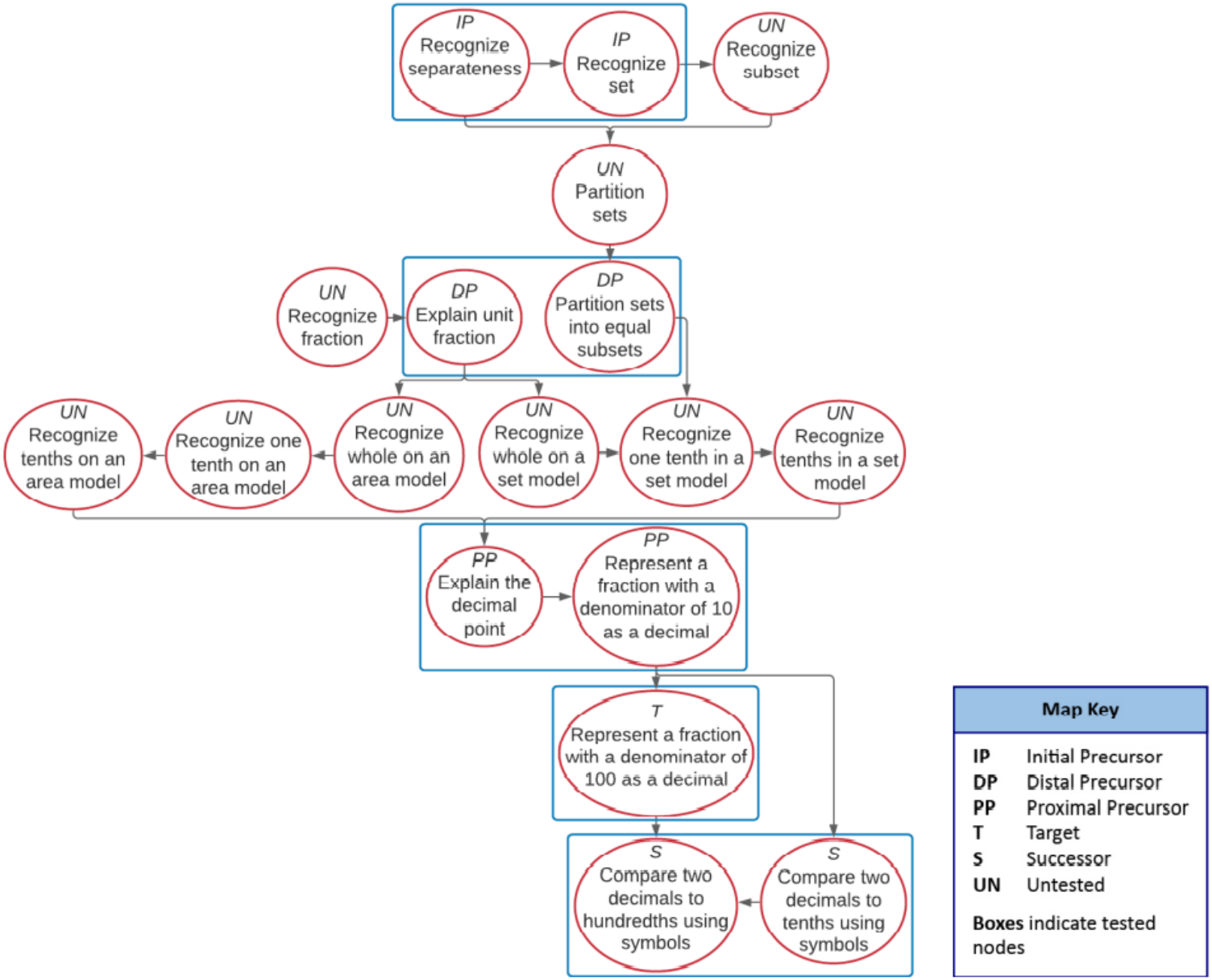


How is the Distal Precursor related to the Target?

As students become more adept at tracking discrete objects, they will begin working on one-to-one distribution of objects to person, objects to objects, and objects to available space (e.g., giving each person in the group a pencil; given four counters, they would line up four more counters in front of or on top of the first set; given three chairs at a table, the student would place a cup on the table for each available chair). As students understanding of one-to-one distribution develops, provide students many opportunities to recognize equivalence in sets with same items and then sets with differing items. As students work on all these skills and concepts, continue to draw their attention to parts and wholes.

Jeanette Nowak @ n

M.EE.8.NS.2.a Express a fraction with a denominator of 100 as a decimal.



Rubric of Student Success

M.EE.8.NS.2.a - Express a fraction with a denominator of 100 as a decimal.

Level 3 Students will… Successor and Target Students will…	Level 2 Students will… Proximal Precursor and Distal Precursor Students will…	Level 1 Students will… Initial Precursor Students will…
Level 3 Unique does not have lessons on this standard.	Level 2 Unique does not have lessons on this standard.	Level 1 Unique does not have lessons on this standard.
Successor • Compare two decimals to hundredths using symbols Target • Compare two decimals to tenths using symbols	Proximal Precursor • Explain the decimal point • Represent a fraction with a denominator of 10 as a decimal Distal Precursor • Explain unit fraction • Partition sets into equal subsets	Initial Precursor • Recognize separateness • Recognize set

Jeanette Novak

Instructional Ideas

M.EE.8.NS.2.a - Express a fraction with a denominator of 100 as a decimal.

Numbers can be converted.

The big idea is that the concepts and properties of addition, subtraction, multiplication, and division are the same whether using whole numbers, fractions, or decimals.

- Introduce by asking the essential questions.
- Students will convert a fraction with denominator of 100 to a decimal.
- Use manipulatives as needed.
- Students may use a calculator if needed.
- Included worksheets are examples of what to look for when finding additional materials that best fits your student's needs.

Additional Instructional Ideas

- Go to website for additional instructional resources, materials, and activities for lessons:
    - https://www.msnowakhomeroom.com/2d-decimals.html

Jeanette Nowak @

Converting a fraction with a denominator of 10 or 100 to a decimal: Worksheet 2.1

Name ..... Date ..... Score .....

1. Write 2/10 as a decimal.

2. Write 87/100 as a decimal.

3. Write 3/10 as a decimal.

4. Write 59/100 as a decimal.

5. Write 8/10 as a decimal.

6. Write 41/100 as a decimal.

7. Write 9/10 as a decimal.

8. Write 63/100 as a decimal.

9. Write 7/10 as a decimal.

10. Write 91/100 as a decimal.

Converting a fraction with a denominator of 10 or 100 to a decimal: Worksheet 2.2

Name ..... Date ..... Score .....

1. Write 4/10 as a decimal.

2. Write 83/100 as a decimal.

3. Write 5/10 as a decimal.

4. Write 69/100 as a decimal.

5. Write 6/10 as a decimal.

6. Write 47/100 as a decimal.

7. Write 11/10 as a decimal.

8. Write 74/100 as a decimal.

9. Write 13/10 as a decimal.

10. Write 121/100 as a decimal.

Converting a fraction with a denominator of 10 or 100 to a decimal: Worksheet 2.3

Name ..... Date ..... Score .....

1. Write 5/10 as a decimal.

2. Write 85/100 as a decimal.

3. Write 9/10 as a decimal.

4. Write 54/100 as a decimal.

5. Write 12/10 as a decimal.

6. Write 47/100 as a decimal.

7. Write 15/10 as a decimal.

8. Write 68/100 as a decimal.

9. Write 14/10 as a decimal.

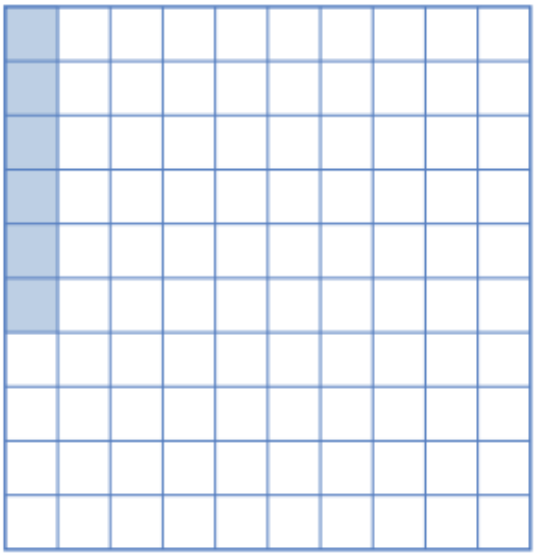
10. Write 96/100 as a decimal.

Hundredths Place

tenths
↓
0.07
↑
hundredths

The second digit to the right of the decimal point is in the hundredths place.

The decimal **0.07** is equal to **seven hundredths**, or $\frac{7}{100}$.



The square has 100 equal parts.
What part of the square is shaded?
Write the answer as a decimal.

_____

Convert each fraction to a decimal.

$\frac{4}{100}$ = .04 $\frac{9}{100}$ = ____ $\frac{5}{100}$ = ____ $\frac{8}{100}$ = ____

$\frac{1}{100}$ = ____ $\frac{2}{100}$ = ____ $\frac{7}{100}$ = ____ $\frac{6}{100}$ = ____

Convert each decimal to a fraction.

0.05 = ____ 0.01 = ____ 0.08 = ____ 0.03 = ____

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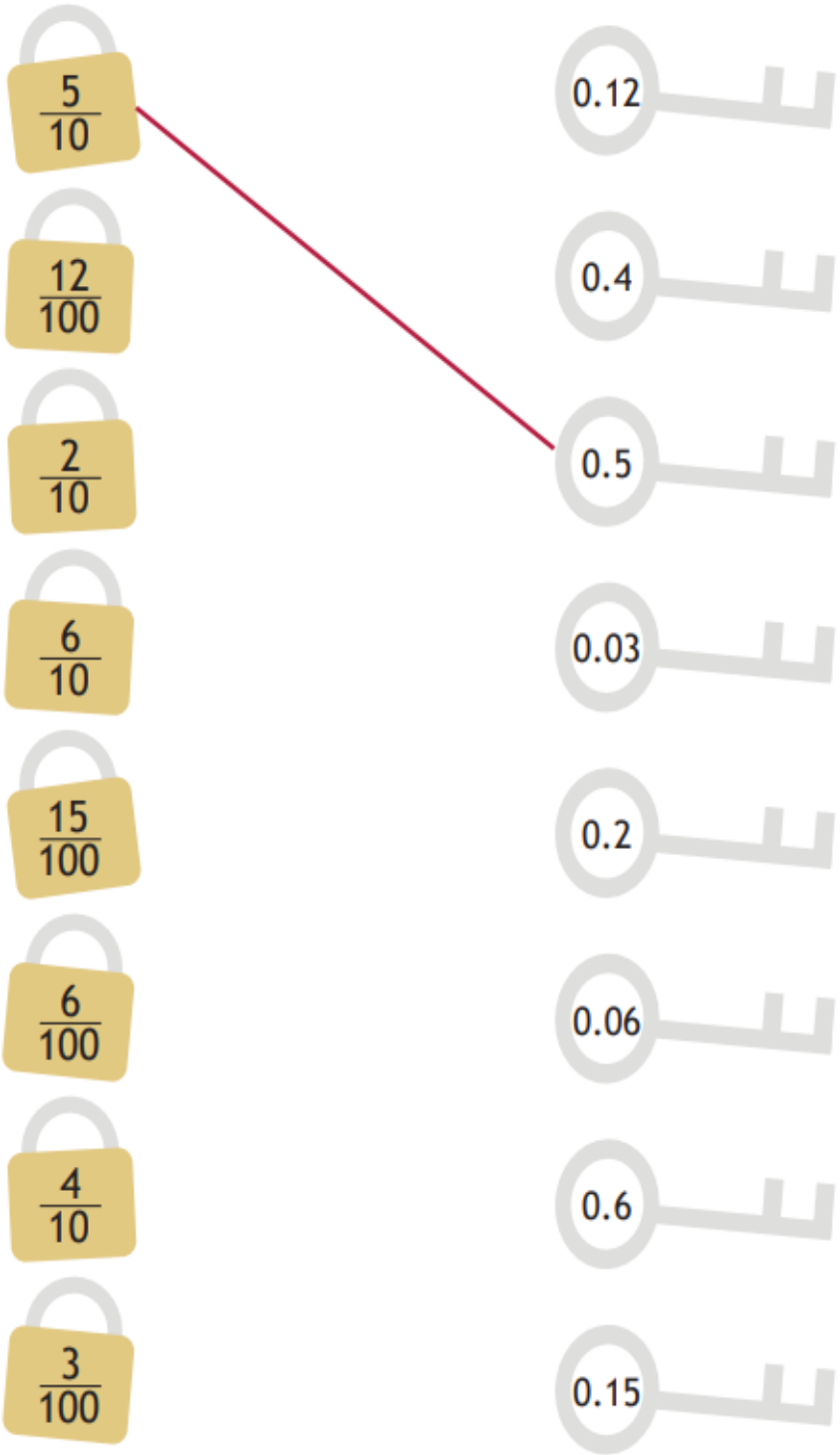
Lock & Key

Find the key that unlocks each lock! Connect each **fraction** in the lock with an equivalent **decimal** in the key.



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Decimal and Fraction Equivalents for Tenths and Hundredths

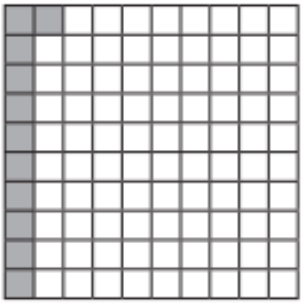
I can convert tenths and hundredths from fractions to decimals.

Complete the table by writing the equivalent fraction or decimal.

Fraction	Decimal
$\frac{54}{100}$	
	0.46
$\frac{2}{100}$	
$\frac{19}{100}$	
	0.82
	0.44
$\frac{81}{100}$	
	0.93
$\frac{60}{100}$	
	0.01
$\frac{23}{100}$	
	0.37
	0.26
$\frac{71}{100}$	
	0.66
$\frac{99}{100}$	

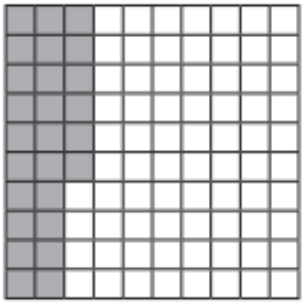
Fractions: Hundredths

All the squares below have been separated into 100 equal parts. Each part is $\frac{1}{100}$. To write this as a decimal fraction you would write 0.01. For all the squares below, write the fraction shaded both as a fraction and a decimal fraction. The first one has been done for you.

1. 

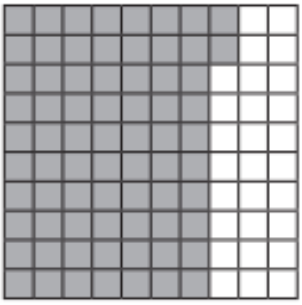
Fraction: $\frac{11}{100}$

Decimal: **0.11**

2. 

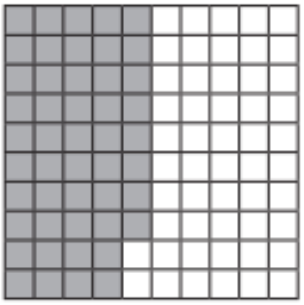
Fraction: _____

Decimal: _____

3. 

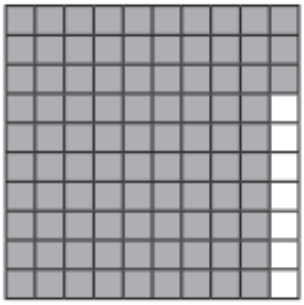
Fraction: _____

Decimal: _____

4. 

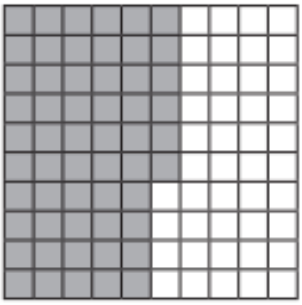
Fraction: _____

Decimal: _____

5. 

Fraction: _____

Decimal: _____

6. 

Fraction: _____

Decimal: _____

Challenge: Complete these equivalent fractions. You could use a tenth and hundredth square to help you. The first one is completed as an example.

1. $\frac{10}{100} = \frac{1}{10}$

2. $\frac{70}{100} = \frac{\square}{10}$

3. $\frac{40}{100} = \frac{\square}{10}$

4. $\frac{90}{100} = \frac{\square}{10}$

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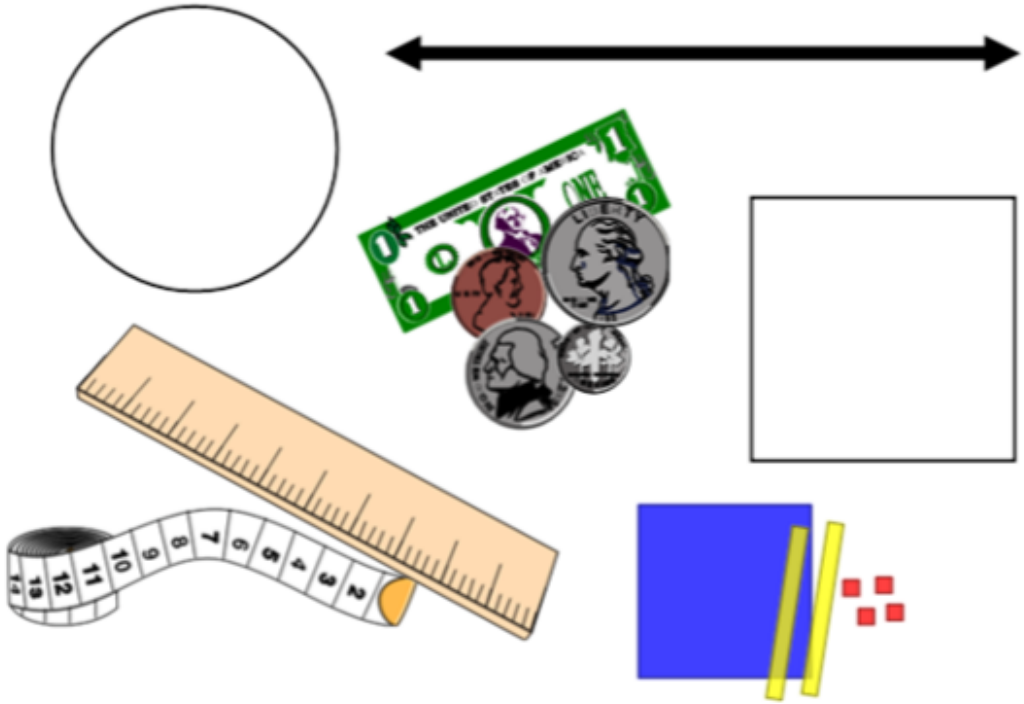
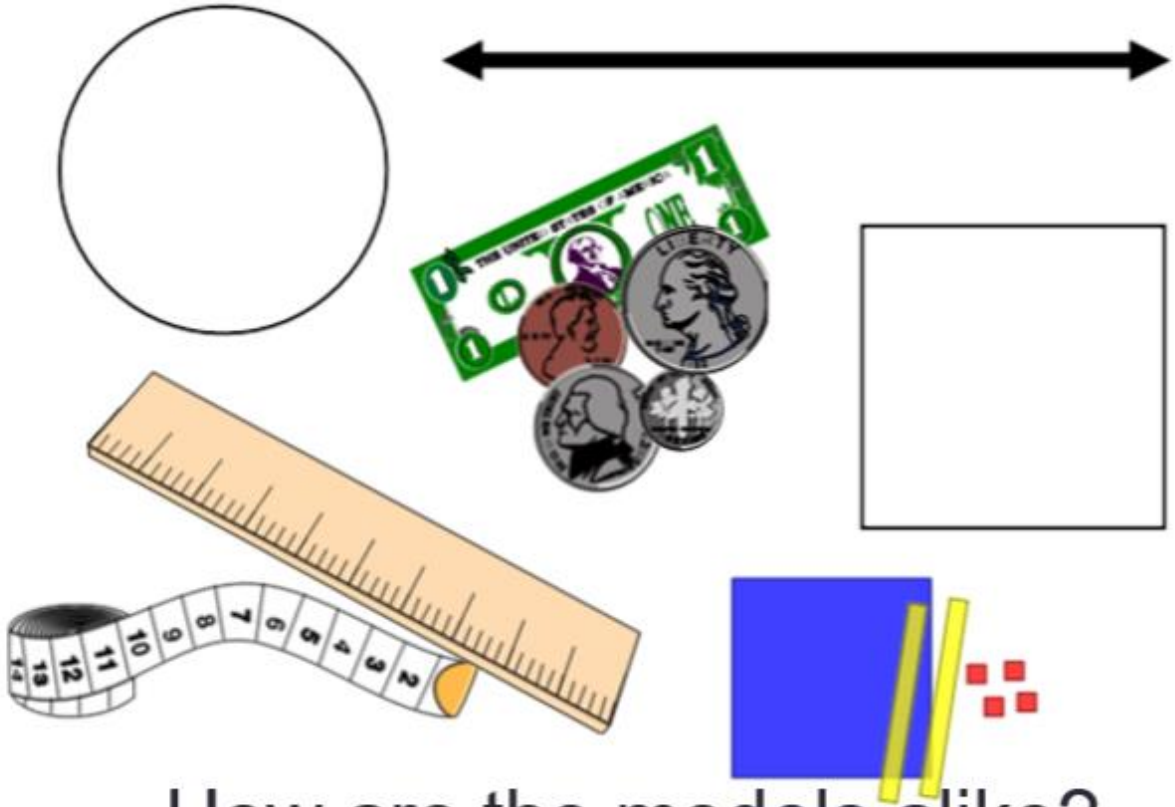
Decimal Models

- A variety of fractional models should be used in the instruction of decimal concepts.
- Visual models include area and length models such as decimal grids, decimal circles, number lines, and meter sticks.



Introducing Decimals

Partition each model into tenths and hundredths.



How are the models alike?

How are they different?

Introduction to Decimals

- Decimal numbers are like fractions. They identify quantities that are between whole numbers.
- You can write numbers less than 1 by using a decimal point.
- Our number system is based on tens. Decimal means 10.

Fraction	Decimal	Word	Money
		one tenth	
		one hundredth	

What do you notice about the chart?

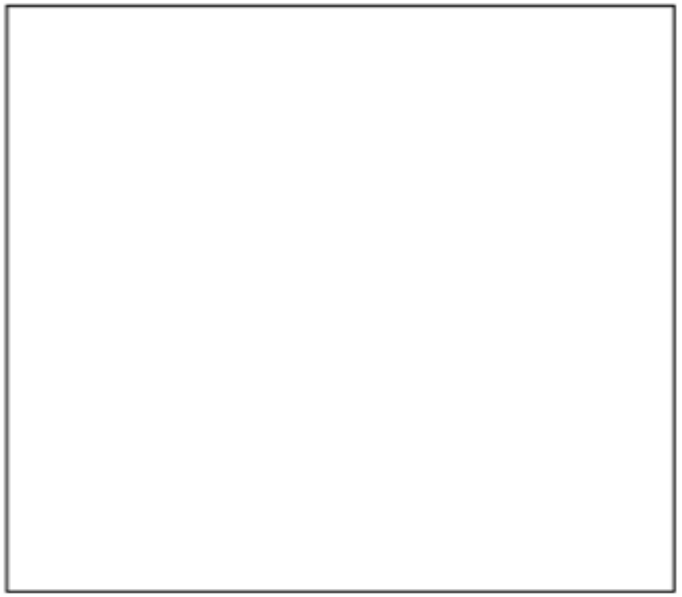
Fraction	Decimal	Word
$\frac{1}{10}$	0.1	one tenth
$\frac{1}{100}$	0.01	one hundredth

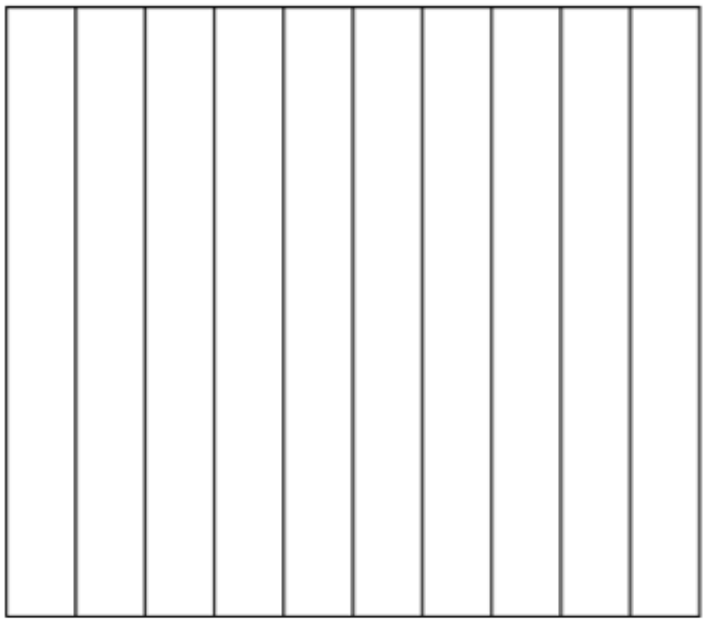
Decimal Place Value Chart

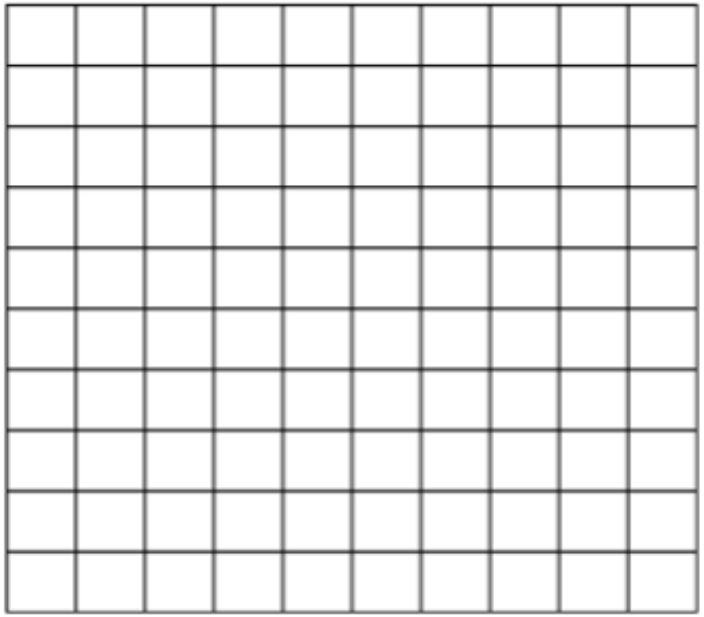
Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones	Decimal point	Tenths	Hundredths	Thousandths	Ten-thousandths	Hundred thousandths	Millionths
			3	6	8	4	.	2	6				

Decimal Squares

- How can you partition the square into tenths and hundredths?

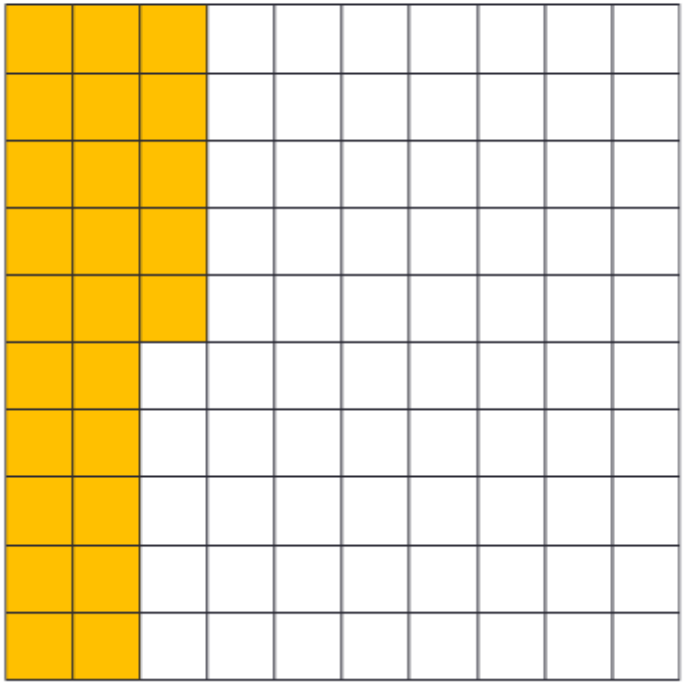






Decimal Grids/Squares

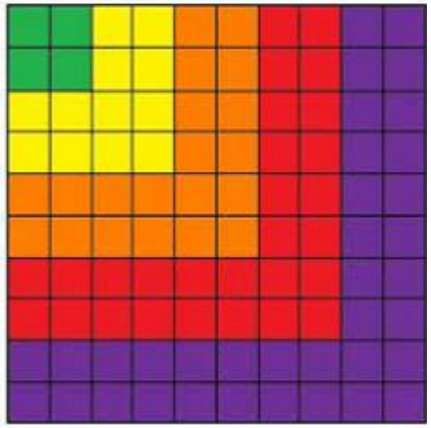
- What number is represented on the grid?

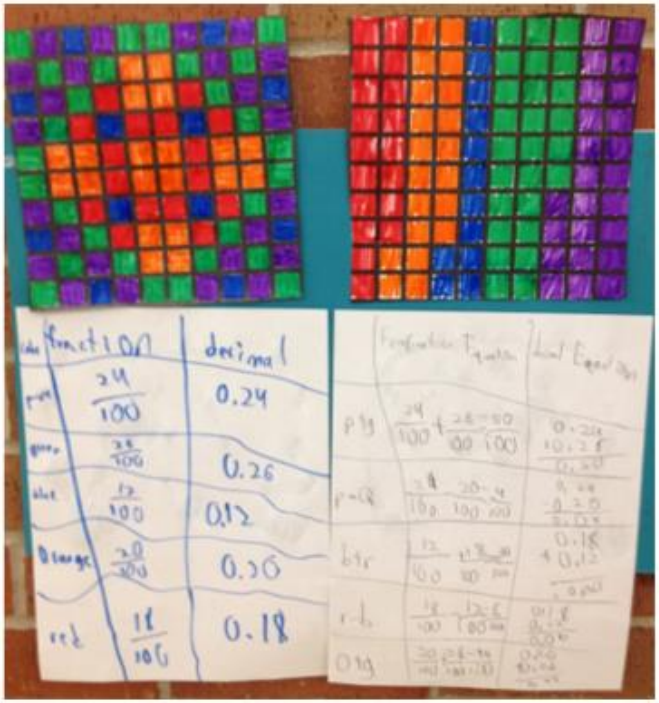


- What part of the grid is shaded?
- Give your answer as a fraction and as a decimal.
- How many whole tenths are shaded?
- How many extra hundredths?

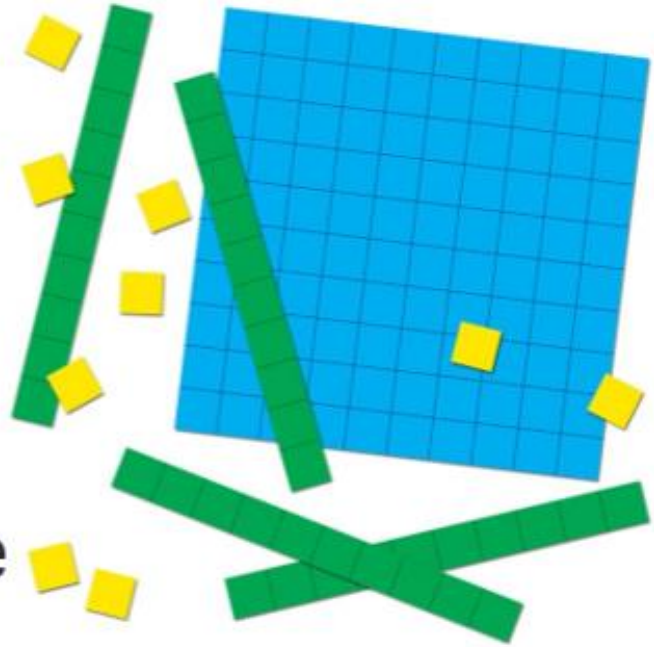
Decimal Grid Art

- Students create an artistic design on a 10 x 10 decimal grid and identify each color with decimals and fractions





Base Ten Blocks

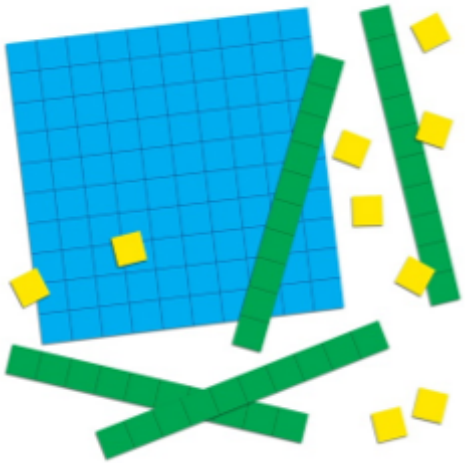


- How can you partition the blocks into tenths and hundredths?
- If the flat is one, what is the value of the rod? What is the value of the unit?
- Express the value as a decimal and as a fraction.

Jeanet

Decimal Models

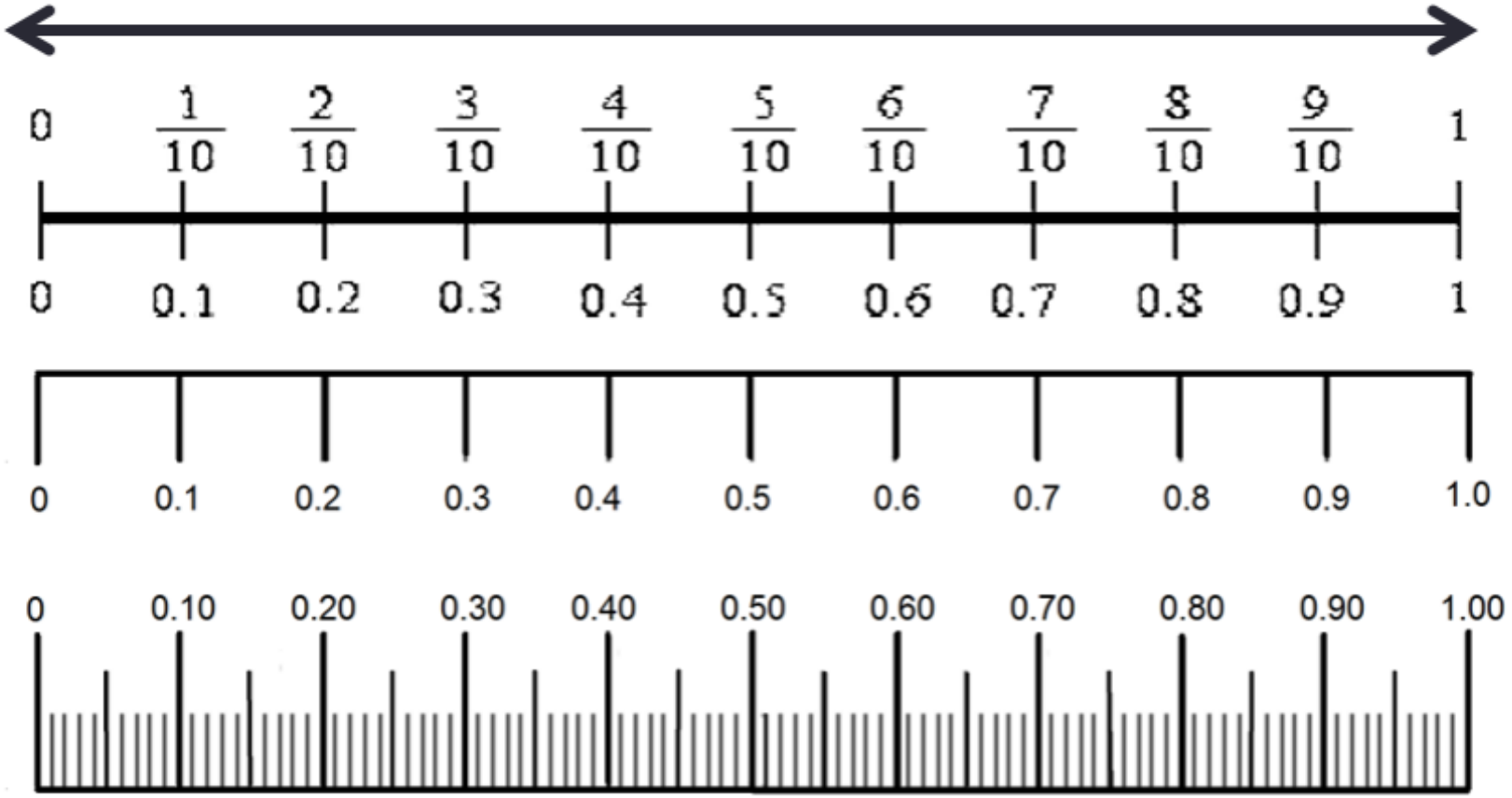
- With a given model, any piece could be chosen as the ones piece; thus the decimal point has the important role of designating the units. (ones) position (to the left of the decimal point)
- Caution: Be certain the model has meaning for students.



If the rod is one, what would the value of unit cube be? Of the flat?
What if the rod was 100? What would the flat and unit cube be?
What if the flat equals 10? How much would the rod and unit cube be worth?

Number Lines

- How can you partition the number line into tenths and hundredths?



Money as a Model

While money can be written in decimal notation, and children can relate decimal numbers to their understanding of money, it is not recommended as a model, but as an application.

Why do you think this is the case?

How can we use money as an application for decimals?

Decimals in the Real World

In what real world situations do we use decimals?

Complete a decimal hunt to find examples of where decimals are used in the world.

Jeanette

To help children make connections…

- Use familiar fraction concepts and models to explore tenths and hundredths.
- Help them see how the base-ten system extends to include numbers less than one.
- Help children use models to make meaningful translations between fractions and decimals.

Jeanette Nowak @ msnowak

Is it a Match?

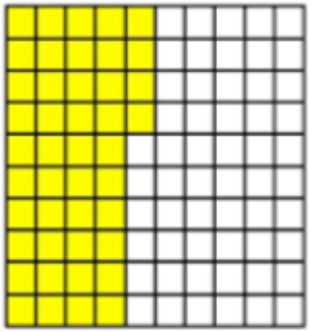
- Play various matching games to make connections between fractions and decimals.

forty-four hundredths

$\frac{44}{100}$

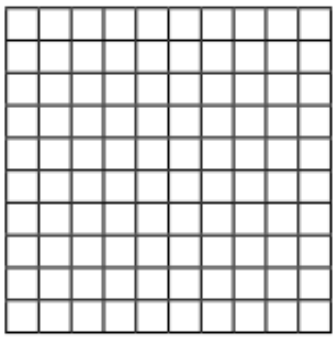
$\frac{40}{100} + \frac{4}{100}$

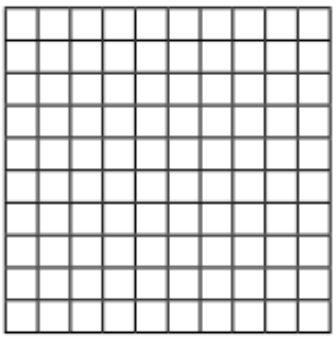
.44

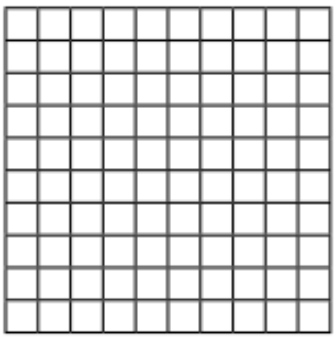


Identifying Hundredths

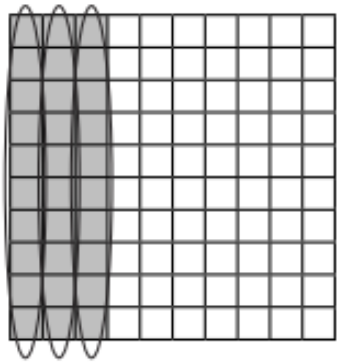
1. Each square is one whole. Colour in the fraction shown for each square.

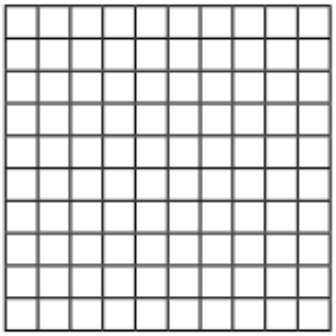
$\frac{35}{100}$ 

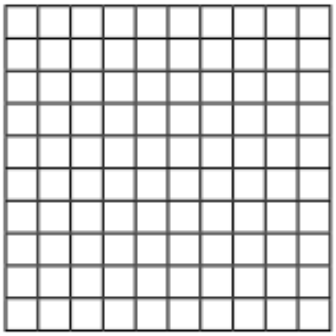
$\frac{87}{100}$ 

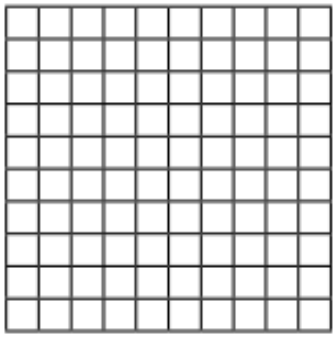
$\frac{64}{100}$ 

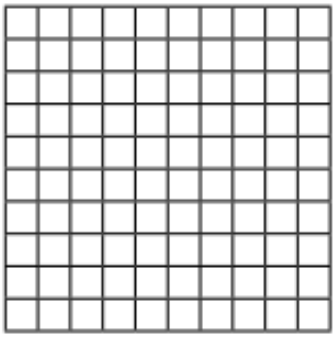
2. Each square is one whole. Colour in the fraction for each square. Then draw circles to show tenths and write how many tenths you have coloured.

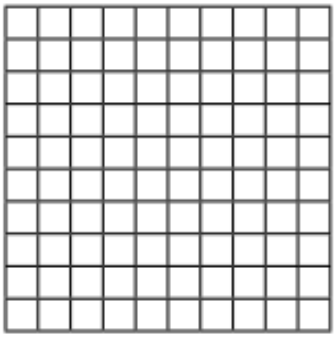
$\frac{30}{100}$ $\frac{3}{10}$ 

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

$\frac{50}{100}$ $\frac{}{10}$ 

$\frac{80}{100}$ $\frac{}{10}$ 

$\frac{40}{100}$ $\frac{}{10}$ 

$\frac{70}{100}$ $\frac{}{10}$ 

3. Complete the following pairs of equivalent fractions. You could use Base ten blocks to help you.

a. $\frac{10}{100} = \frac{}{10}$

b. $\frac{}{100} = \frac{2}{10}$

c. $\frac{}{100} = \frac{5}{10}$

d. $\frac{}{100} = \frac{9}{10}$

Can you explain how you worked them out?

Fractions and Decimals

Number Sequences

Complete the number sequence by adding the missing fractions:

1.

$\frac{2}{10}$	$\frac{3}{10}$		$\frac{5}{10}$		$\frac{7}{10}$

2.

	$\frac{29}{100}$	$\frac{30}{100}$			

3.

	$\frac{71}{100}$			$\frac{68}{100}$	

4.

$1\frac{3}{10}$			1	$\frac{9}{10}$	

Complete the following decimal number sequences by filling in the blanks:

5.

0.5	0.6	0.7					

6.

0.38	0.39	0.4					

7.

0.85	0.84	0.83					

8.

0.9	0.8	0.7					

Draw a line to match each fraction with its decimal equivalent:

$1\frac{36}{100}$	$\frac{84}{100}$	$\frac{4}{10}$	$\frac{80}{100}$	$\frac{8}{100}$
0.08	0.4	1.36	0.84	0.8

Converting Decimal Tenths and Hundredths to Fractions

Converting decimals tenths and hundredths to fractions couldn't be easier - all you need is a place value chart! To convert from a decimal into a fraction, we write the number on the place value chart then **read the number off the place value chart**.

0.7=

Ones		tenths
0	.	7

No ones and 7 tenths. So the fraction is... $\frac{7}{10}$!

A. Write these decimals into the place value chart. Read the place value and write the decimal as a fraction. The first question has been completed for you.

Decimal	Place Value Chart			How many tenths?
0.7	Ones		tenths	7 tenths = $\frac{7}{10}$
	0	.	7	
0.3	Ones		tenths	
		.		
zero point two	Ones		tenths	
		.		
0.4	Ones		tenths	
		.		
0.1	Ones		tenths	
		.		
0.9	Ones		tenths	
		.		
zero point eight	Ones		tenths	
		.		

Working with hundredths is similar except we need to include the tenths too. There are 10 hundredths in a tenth.

O		t	hundredths
0	.	7	3

We have 73 hundredths - therefore $\frac{73}{100}$

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B. Complete the table.

Decimal	Place Value Chart				How many hundredths?
0.73	Ones		tenths	hundredths	73 hundredths = $\frac{73}{100}$
	0	.	7	3	
0.20	Ones		tenths	hundredths	
	0	.			
zero point four six	Ones		tenths	hundredths	
	0	.			
nought point nought 4	Ones		tenths	hundredths	
	0	.			
0.42	Ones		tenths	hundredths	
	0	.			
0.66	Ones		tenths	hundredths	
	0	.			
0.99	Ones		tenths	hundredths	
	0	.			

C. What do you think this decimal is as a fraction?

O		t	h	th
0	.	0	0	7

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Credits

Websites Used for Worksheets and Lesson Ideas:

- https://www.education.com
- https://www.twinkl.com
- https://www.superteacherworksheets.com
- https://www.easyteacherworksheets.com
- https://www.mathworksheets4kids.com
- https://www.math-salamanders.com
- https://www.math-drills.com
- https://www.tutorialspoint.com/converting_fractions_to_decimals/converting_fraction_with_denominator_10_100_decimal_worksheets.htm

Resources Used to Help Create the Pacing Guide:

DLM Essential Elements Unpacking

- https://www.dlmpd.com/dlm-essential-elements-unpacking

Instructional Resources for YE Model States

- https://dynamiclearningmaps.org/instructional-resources-ye/mathematics

Dynamic Learning Maps

- https://dynamiclearningmaps.org

Unique Learning System

- https://www.n2y.com/unique-learning-system

Jeanette Nowak @ msnowakhomeroom.com

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