MISSISSIPPI DEPARTMENT OF EDUCATION
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MISSISSIPPI

EXEMPLAR Units & Lessons

MATHEMATICS

Grade 4

Grant funded by:
W.K. KELLOGG FOUNDATION

Lesson 2: Modeling Marathon

Focus Standard(s): 4.NF.6

Additional Standard(s): 4.NF.5, 4NBT.1

Standards for Mathematical Practice: SMP.2, SMP.4, SMP.5, SMP.7

Estimated Time: 45 minutes

Resources and Materials:

- Chart Paper
- Dry Erase Markers
- Play (or Real) Money
- Sheet Protectors
- Handout 2.1: Base Ten Buddies
- Handout 2.2: Hundredths Grid
- Handout 2.3: Tenths Grid
- Handout 2.4: Decimal Displays
- Olympic Results https://www.olympic.org/olympic-results

Lesson Target(s):

- Students will discover the relationship between decimal fractions and fractions.
- Students will create pictorial representations of decimal fractions and fractions.

Guiding Question(s):

- What is the relationship between decimals and fractions?

Vocabulary

Academic Vocabulary:	Instructional Strategies for Academic Vocabulary:
• cubes • decimal fraction • equivalent • flats • hundredth • rods • tenth • units	☐ Introduce words with student-friendly definitions and pictures ☐ Model how to use the words in discussion ☐ Discuss the meaning of word in a mathematical context ☐ Create pictures/symbols to represent words ☐ Write/discuss using the words **Note:** Vocabulary instruction should be embedded into the lesson each day using the strategies suggested above.

Symbol	Type of Text and Interpretation of Symbol
	Instructional support and/or extension suggestions for students who are EL, have disabilities, or perform well below the grade level and/or for students who perform well above grade level
✓	Assessment (Pre-assessment, Formative, Self, or Summative)

Instructional Plan

Understanding Lesson Purpose and Student Outcomes:
Students will use money and tenths and hundredths grids to make the connection between decimal fractions and fractions.

Anticipatory Set/Introduction to the Lesson: Base Ten Buddies
Pass out the individual cards from **Handout 2.1**: **Base Ten Buddies.** Tell students to take a moment to determine how to read their value out loud.

For students who scored 0 on the previous day's exit ticket, take time to do a quick huddle and ensure they can read the value on their card. For students who scored 50% or 100% on the previous day's exit ticket, allow them to form their own group huddle and work together to determine the values of their own cards.

Give students a few moments to find their Base Ten Buddy. Have a quick discussion about each place value.

- ✓ Using the classroom role checklist, make a + or – for students who can find their partners and express their numbers orally.

Ask students to hold onto their card until end of class.

Activity 1: Show Me the Money

Tell students that the day's lesson will focus on representing decimal fractions in multiple ways and that they will begin by using money to represent these decimal fractions (SMP.4).

Place students in their country/group. Provide each group with a bag of pennies, nickels, dimes, and quarters. Students will also need dollar bills (SMP.2).

> T: For this task, we will only need two coins. One coin we need will represent the tenths place and one coin will represent the hundredths place. Work with your group to determine which two coins we will need. Think about the base ten blocks we used yesterday to help you make this connection.

Possible Prompting Questions:

- Which of these coins would represent the same as a unit?
- We need one hundred units to make a whole, which coin would we need 100 of to make a whole?
- Which of these coins would represent the same value as a rod?
- We need ten rods to make a whole, which coin would we need 10 of to make a whole?

> T: You have correctly chosen pennies to represent the hundredths place and dimes to represent the tenths place. Please remove these from the bag and put the bag to the side.

Write 0.01 on the board. Ask students to use their coins and place value chart to show this number using money (SMP.5). Ask students how many pennies would be needed to make a dime and how many pennies would be needed to make a dollar.
Write 0.10 on the board. Ask students to use their coins and place value chart to show this number using money. Ask students how many dimes would be needed to make a dollar.

Write 0.52 on the board. Ask the students to create this number using coins and practice reading it as both a money value as well as a decimal fraction.

T: How many tenths do you have?
S: 5
T: How many hundredths do you have?
S: 2
T: How do you read this number as a money value?
S: Fifty-two cents
T: How do you read this number as a decimal fraction?
S: Fifty-two hundredths

At this time, provide dollar bills to students. Write 4.28 on the board, and ask students to create this number using money. Have students practice reading it both as a money value as well as a decimal fraction. Follow the same questioning as above.

Instruct students to use their Base Ten Buddy card and create the value using dimes and pennies. Have them find their Base Ten Buddy to check to see if both partners have the same answer.

For students who are EL, have disabilities, or perform well below grade level:

- For students who received a – on the checklist during the previous activity, ask those students to bring their card to the teacher table and provide additional support with reading the number and identifying the tenths and hundredths place.

Activity 2: Hundredths Grids and Tenths Grids

Provide students with **Handout 2.2 Hundredths Grid, Handout 2.3: Tenths Grid,** sheet protectors, and dry erase markers. Tell students they will move from the concrete objects of base ten blocks and money to the pictorial representations using tenths and hundredths grids to display numbers in both decimal and fraction form.

Display the tenths and hundredths grid on the overhead. Lead students through a Think-Pair-Share to answer the following questions:

1. What does one entire grid now represent?
2. What does one rod represent?
3. What does one unit represent?

Shade in 30 units on the hundredths grid on the overhead.

T: How many total units are on this grid?
S: 100
T: How many units did I shade?
S: 30
T: How can I represent this in fraction form?
S: 30/100
T: *Write 30/100 next to the grid*
T: How can I express this in decimal form?
S: 0.30

Shade in 3 rods on the tenths grid on the overhead.

T: How many total rods are on this grid?
S: 10
T: How many rods did I shade?
S: 3
T: How can I represent this in fraction form?
S: 3/10
T: How can I represent this in decimal form?

S: 0.3
T: Talk to your neighbor about what you notice about the two grids.

Lead students to make the connections between this pictorial representation and the concrete objects (SMP.7).
T: We know that 30 units and 3 rods are equivalent. We also know that 30 pennies and 3 dimes have the same value. The same goes for these fractions 30/100 and 3/10.

Write 80/100 on the board. Ask students to shade in this fraction on the hundredths grid. Then ask them to create the same representation on their tenths grid and write the fraction represented. Lead a discussion about the equivalency of the two numbers. Have students assist in writing both as decimal fractions.

T: Let's practice representing a few more numbers using grids:

Write 0.57 on the board.
T: What is this number?
S: Fifty-seven hundredths.
T: Which grid do I need to shade in this number?
S: The hundredths grade (or a combination of the tenths grid and hundredths grid)
T: How many tenths or columns will need to be shaded?
S: 5
T: How many hundredths?
S: 7
T: What is this number again?
S: Fifty-seven hundredths
T: How can I write this number as a fraction?
S: 57/100

Have students use their Base Ten Buddy card to color in the value on their appropriate grid. For students with numbers larger than 1, provide them with an extra grid and scaffold appropriately. Share this fractional representation with the class. Then have students stand behind their chairs leaving the grid and Base Ten cards visible. Have them rotate around their country/group and check their team's answers. If they agree, they will write a ☺ if they disagree, they will write a ☹. Provide the teams a few minutes to help their teammates with any misconceptions after all have returned to their original sheet.

For students who are EL, have disabilities, or perform well below grade level:

- Allow students to use Base Ten Blocks to create a concrete representation of their card to use as a guide for shading.

Activity 3: Anchoring Understanding

Pass out **Handout 2.4: Decimal Displays.** Tell students that they will work together to create an anchor chart that can be used as a reference for the remainder of the unit. Write the table below on chart paper. Show the students how to represent three-tenths in word form, decimal form, fraction form, and base ten form.

Complete eight-tenths with the class, making sure students are able correctly verbalize and represent the number in each form. Write the following values on the anchor chart for students to complete with their groups before sharing out:

1. 1.19
2. Eighty-two hundredths
3. 71/100

Word Form	Decimal Form	Fraction Form	Base Ten Representation
Three-tenths	.3	3/10	

Reflection and Closing:

- ✓ Have students fold a sheet of paper two times to create four equal sections and label them as follows. Tell the students to express their Base Ten Buddy card in each of the four ways.

Word Form	Standard Form
Fraction Form	Base Ten Representation

Again, use a checklist or classroom roll to determine which students score below 50% and may need additional help.

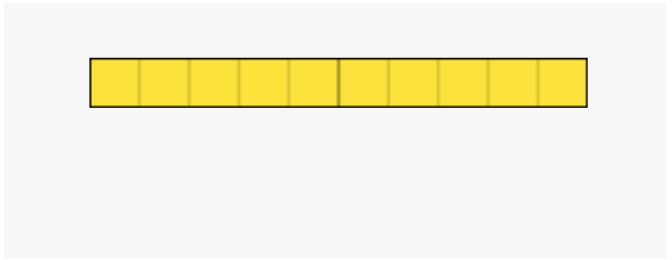
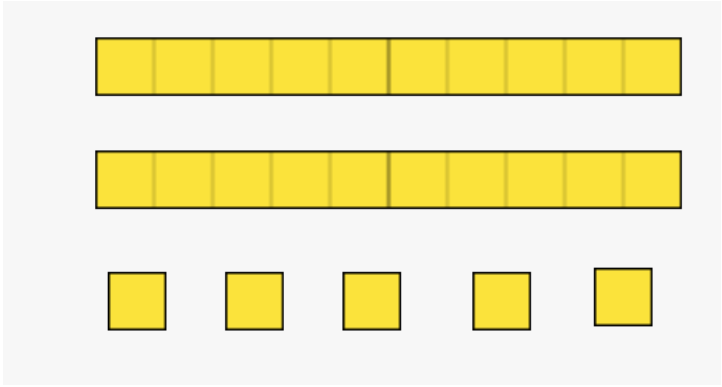
Homework

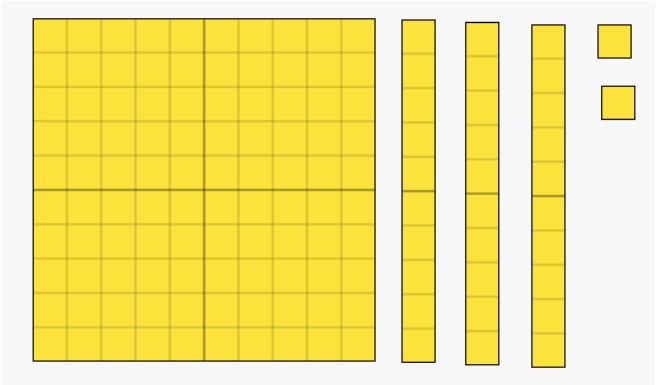
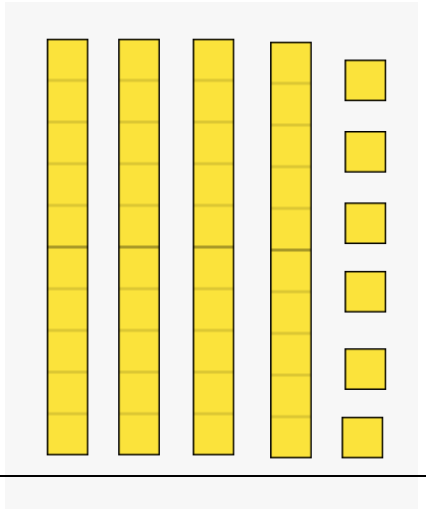
Provide students with this question: Which country outscored Team USA by 0.13 on the men's pole vault in the 2016 Summer Olympics and won the gold?

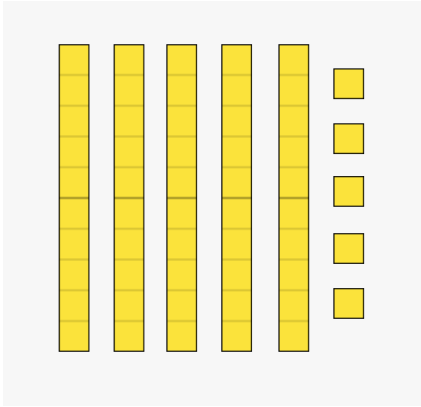
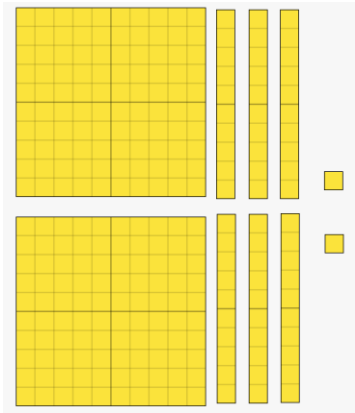
(Team France)

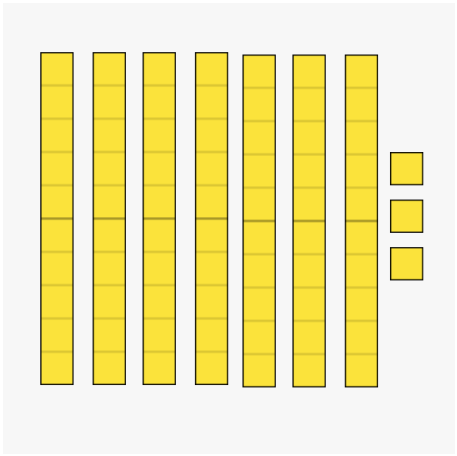
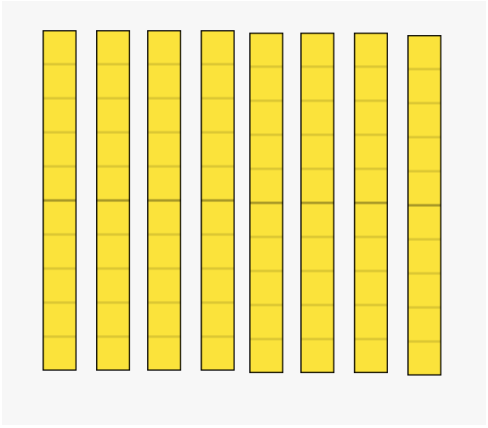
Pole Vault results found at Olympic Results

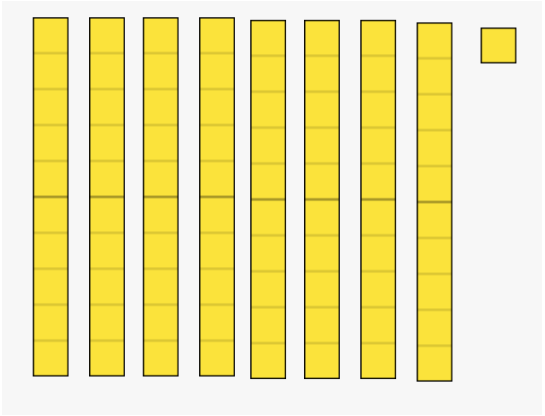
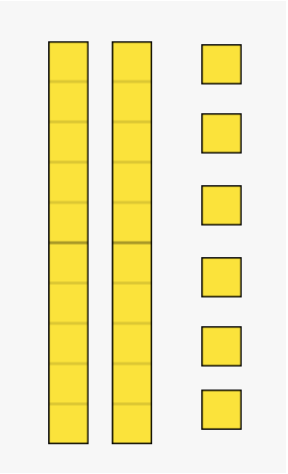
Handout 2.1: Base Ten Buddies

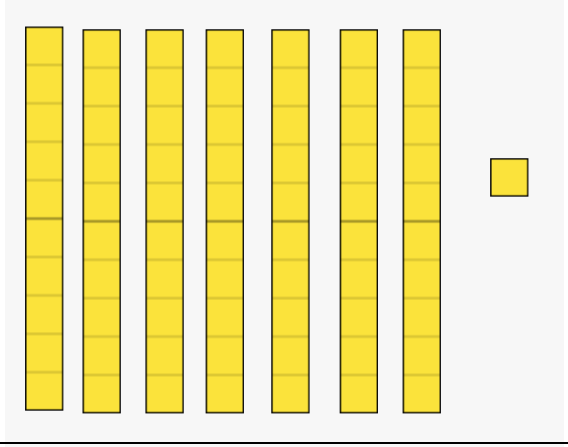
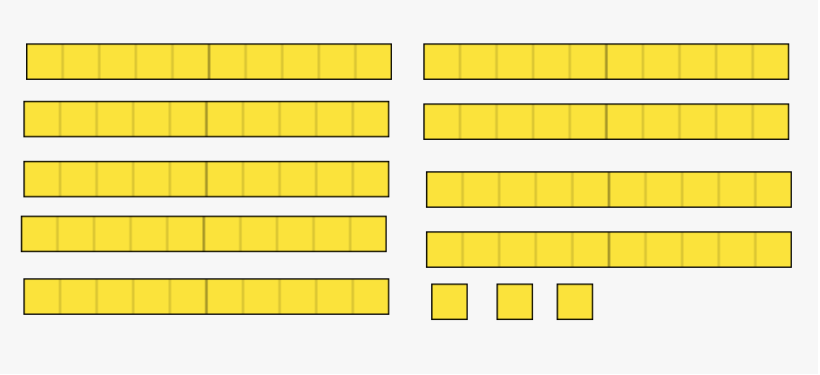
0.1	
0.25	

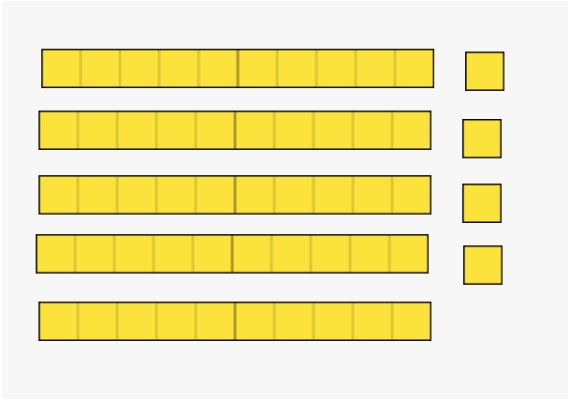
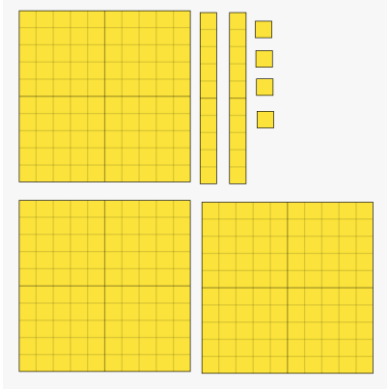
1.32	
0.46	

0.55	
2.62	

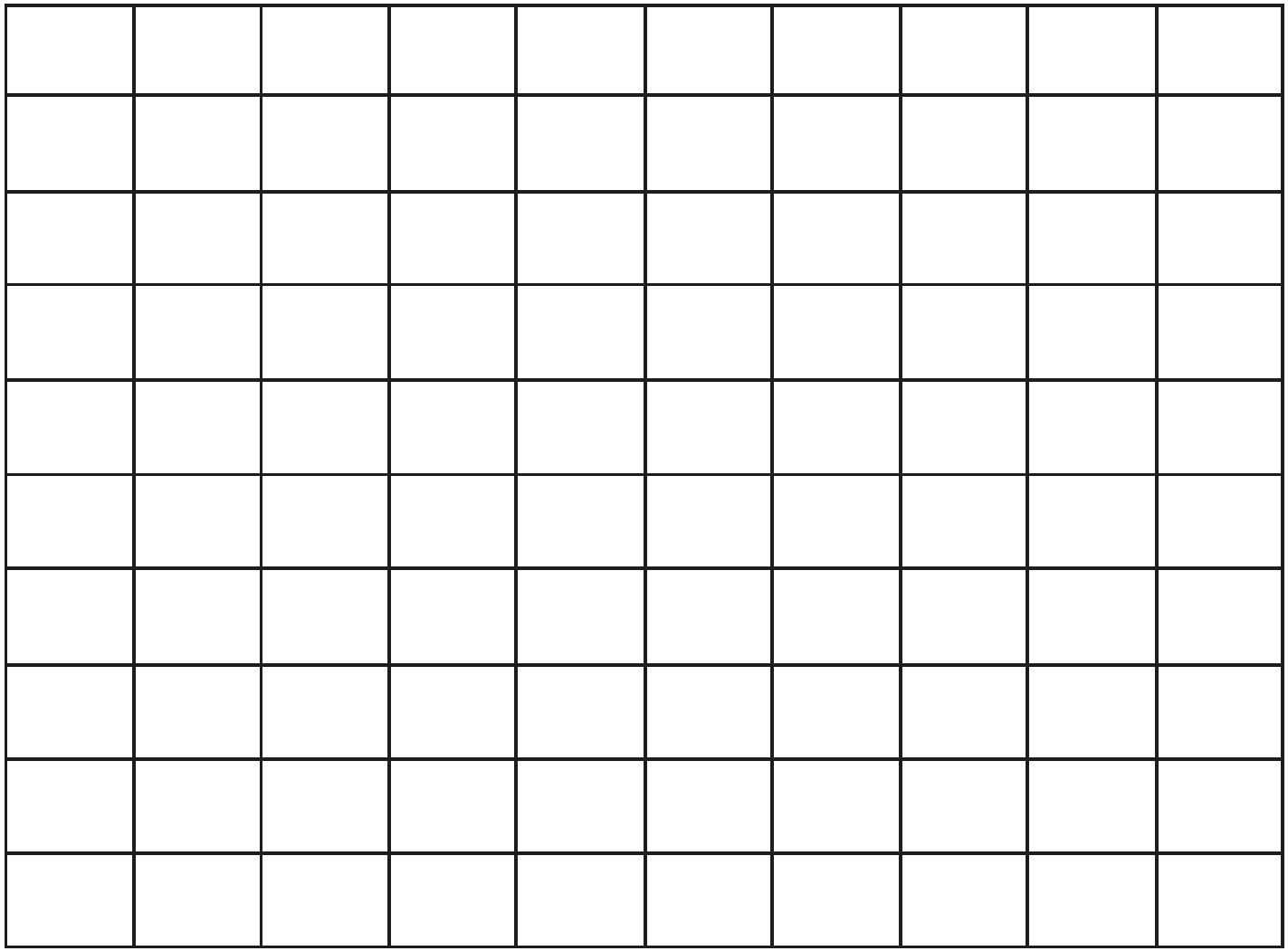
0.73	
0.8	

0.91	
0.26	

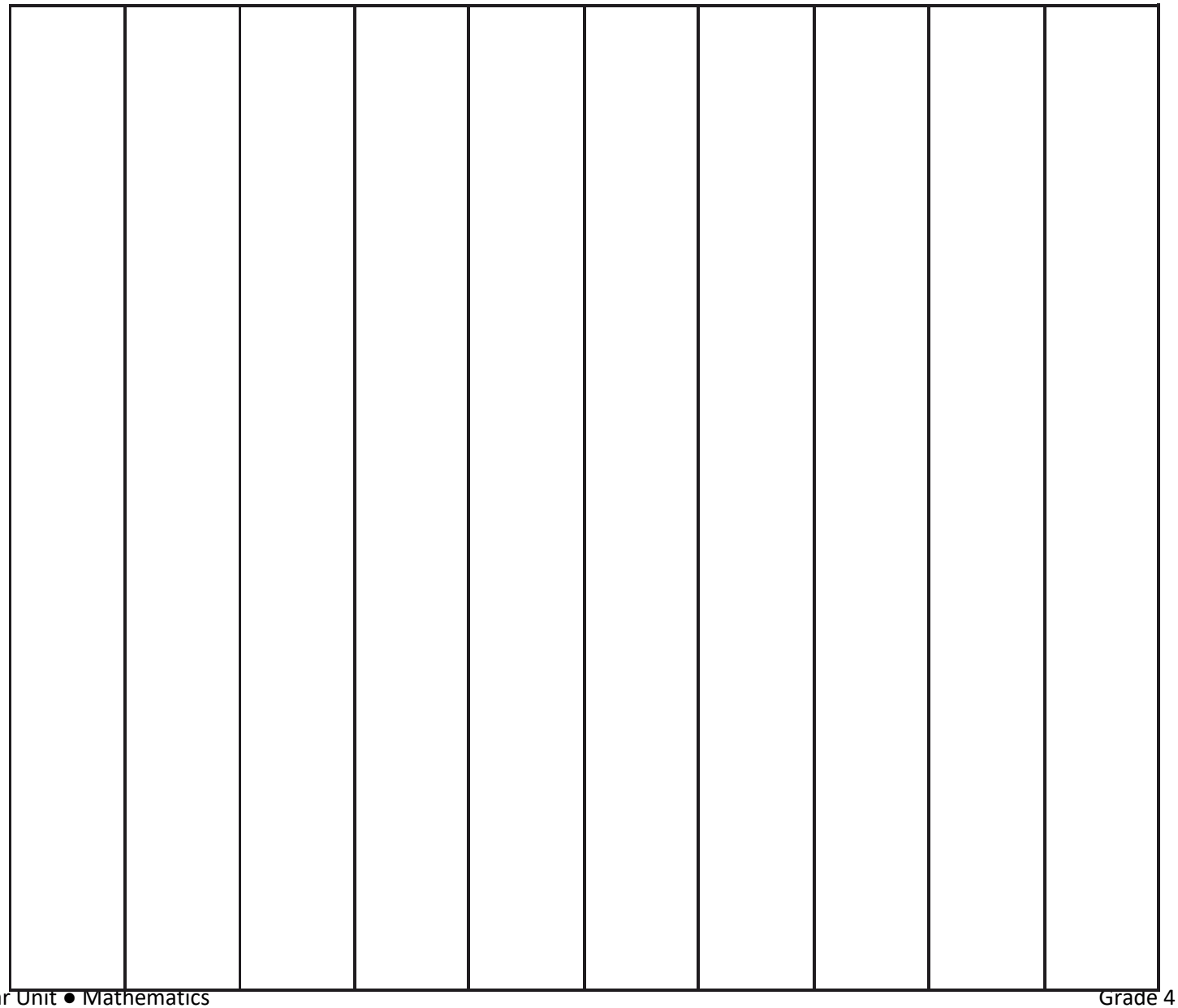
0.71	
0.93	

0.54	
3.24	

Handout 2.2: Hundredths Grid



Handout 2.3: Tenths Grid



Handout 2.4: Decimal Displays

Word Form	Standard Form	Fraction	Base Ten Representation

For training or questions regarding this unit,
please contact one of the following:

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