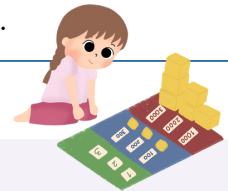


PLACE VALUE



In this learning plan, students explore how digits in whole numbers and decimals have value depending on their place. Furthermore, they learn that multiplying a number by ten shifts each digit one place to the left, and dividing by ten shifts each digit one place to the right. They will practice solving multiplication and division problems involving decimals through a variety of activities.



STANDARDS

CCSS.MATH.CONTENT.5.NBT.A.1

Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and $\frac{1}{10}$ of what it represents in the place to its left.

OBJECTIVES

- ✓ Students will be able to explain that a digit in one place represents ten times what it represents in the place to its right.
- ✓ Students will be able to multiply and divide by tens, hundreds, and thousands, including multiplying and dividing decimals.

GUIDING QUESTIONS

What are the first three place values in decimal numbers?

What happens to the digits in a decimal number when you multiply by ten?

What happens to the digits in a decimal number when you divide by ten?

MATERIALS

- Decimal Mat worksheet
- True or False Sorting worksheet
- Number Relationships worksheet
- Party Planner worksheet
- Tic-Tac-Toe worksheet
- Page protectors
- Dry-erase markers
- Dice
- Scissors & glue
- Construction paper or a composition notebook
- Magazines, advertisements, newspapers or the Internet to search for items and prices for party supplies



ASSESSMENTS

Formative assessments and checks for understanding occur throughout the lesson:

- Observe students' ability to explain that a digit in one place represents ten times what it represents in the place to its right.
- Watch for accuracy as students practice multiplying and dividing by tens, hundreds, and thousands, including multiplying and dividing decimals.
- Check students' work during guided and independent practice.

Summative Assessment:
Tic-Tac-Toe

DIFFERENTIATION STRATEGIES

- If students need more practice multiplying or dividing by 10, begin by using only whole numbers. Write the number 8 on the board. Practice multiplying it by 10, 100, and 1,000 (80, 800, 8,000). Then, do the inverse operation to divide. Finally, change 8 to 0.8 and help students adjust the decimal point and place values.
- Remind students of the decimal place values by relating them to fractions. Write $\frac{1}{10}$, $\frac{1}{100}$, and $\frac{1}{1000}$ as fractions. Then, ask students to match these to the correct place value columns in a chart.

EXTENSION ACTIVITIES

- Following Activity 4, invite students to take their "party planning" one step further. For example, they could find the total cost of the party supplies by adding their prices together. They can also create word problems using items from their list.
- Invite students to practice extending a place value chart as far as they can. They can write whole-number and decimal place values stretching left and right.



ACTIVITY OVERVIEW

Activity 1

Decimal Mat

Students will multiply and divide decimal numbers by powers of ten.

Activity 2

Guided Practice

Students will sort equations into groups of true and false answers.

Activity 3

Independent Practice

Students will solve problems based on place value relationships.

Activity 4

Party Planner

Students will research and sort prices of items used for planning a party.

Activity 5

Tic-Tac-Toe

Students will multiply or divide by ten while playing tic-tac-toe.

ACTIVITY 1: DECIMAL MAT

- Write the following fractions on the board. Ask students to write each one as a decimal.

$$\frac{3}{10}$$

$$\frac{6}{100}$$

$$\frac{12}{10}$$

- If students need help, show them how $3/10 = 0.3$, $6/100 = 0.06$, and $12/10 = 1.2$.
- Talk about the different place values shown. Also introduce thousandths to students if this is a new concept for them. You can write 0.007 in a place value chart as an example.
- Next, give each student a copy of the Decimal Mat worksheet. Invite them to put their worksheet inside a page protector and write on it with a dry-erase marker.
 - Students will also need three dice.
- Read the directions. "Place this worksheet inside a page protector and use a dry-erase marker. Roll three dice. Write the digits to form a decimal. Then, write the number in the place value chart and multiply and divide by 10."
- Remind students how numbers can shift from one place to the next by multiplying or dividing. Check their work as they roll and write.
- Invite students to share one number they form with the class.



ACTIVITY 2: GUIDED PRACTICE

- Review multiplying and dividing by tens with decimal numbers.
- Then, pass out the True or False Sorting worksheet to each student.
- Instruct students to cut apart the strips and pockets on the worksheet. They can glue the edges of the pockets inside a notebook or on a piece of construction paper. Then, have them place the strips in the correct pockets.
- This activity is great for adding to a composition notebook, such as a math journal. Students may also glue the pockets to a piece of construction paper. Model how to glue only the sides of the pockets to the paper so students can sort the strips.
- Check for accuracy as they determine if each equation is true or false.

ACTIVITY 3: INDEPENDENT PRACTICE

- Write the following digits on the board: 3, 5, and 9. Invite students to write a decimal number using only those digits. (Responses will vary).
- Then, have students practice multiplying and dividing a partner's number by 10 and then 100.
- Encourage students to share their answers with the class.
- Pass out the Number Relationships worksheet to each student.
- Ask students to read the directions for each section and solve.
- Check their answers altogether at the end of the activity. This can help clear up misconceptions about multiplying and dividing with decimals.
- Also, encourage students to share their own number pattern with a partner. They may choose to cover a few of the numbers in their pattern and ask their partner to solve for the missing values.



ACTIVITY 4: PARTY PLANNER

- Ask students to describe a fun party they have been to or a fun party they would like to attend.
- Then, tell them that today they get to practice planning a party!
- Provide each student with a copy of the Party Planner worksheet.
- Invite students to make a list of 10 items they could purchase for a party. They can look through magazines, advertisements, newspapers, or use the Internet to find prices for food and party supplies. Then, they can organize their list in order from least to most expensive.
- Finally, they will choose two items from their list and practice multiplying and dividing that number by ten.
- If you have additional time, see the extension ideas to take this project one step further.

ACTIVITY 5: TIC-TAC-TOE

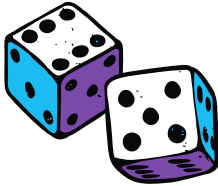
- Provide each student with a copy of the Tic-Tac-Toe worksheet.
- Invite students to play this game with a partner.
 - They can draw an X or an O on a number space. Then they will multiply or divide by the number shown on the tic-tac-toe board.
 - Encourage students to write their new number on scrap paper.
 - The first player to get three in a row wins!
- Watch for accuracy throughout the game to ensure students are understanding how to multiply and divide decimals by multiples of ten.

NAME _____

DATE _____

DECIMAL MAT

Place this worksheet inside a page protector and use a dry-erase marker. Roll three dice. Write the digits to form a decimal. Then, write the number in the place value chart and multiply and divide by 10.

Roll

| | | | |
|--|---|--|--|
| | . | | |
|--|---|--|--|

Write

| Tens | Ones | Tenths | Hundredths | Thousandths |
|------|------|--------|------------|-------------|
| | | . | | |

Multiply your number by 10:**Divide your number by 10:**

NAME _____

DATE _____

TRUE OR FALSE SORTING

Cut apart the strips and pockets below. Glue the edges of the pockets inside a notebook or on a piece of construction paper. Place the strips in the correct pockets.

$$0.7 \times 100 = 700$$

$$0.012 \times 100 = 1.2$$

$$0.08 \times 1,000 = 80$$

$$9 \div 100 = 0.009$$

$$6.3 \div 10 = 0.63$$

$$3.7 \div 1,000 = 0.037$$

$$5.4 \times 100 = 54$$

$$0.004 \times 10 = 0.04$$

TRUE



FALSE



NAME _____

DATE _____

TRUE OR FALSE SORTING

Cut apart the strips and pockets below. Glue the edges of the pockets inside a notebook or on a piece of construction paper. Place the strips in the correct pockets.

$0.7 \times 100 = 700$ F

$0.012 \times 100 = 1.2$ T

$0.08 \times 1,000 = 80$ T

$9 \div 100 = 0.009$ F

$6.3 \div 10 = 0.63$ T

$3.7 \div 1,000 = 0.037$ F

$5.4 \times 100 = 54$ F

$0.004 \times 10 = 0.04$ T

TRUE



FALSE



NUMBER RELATIONSHIPS

Read the directions for each section and solve.

Fill in the blanks to make each equation true.

- $60 = \underline{\hspace{2cm}} \times 10$
- $0.6 = \underline{\hspace{2cm}} \times 10$
- $0.06 = \underline{\hspace{2cm}} \times 10$
- $6 = \underline{\hspace{2cm}} \times 10$
- $\underline{\hspace{2cm}} = 0.0005 \times 10$
- $\underline{\hspace{2cm}} = 0.05 \div 10$
- $\underline{\hspace{2cm}} = 0.5 \times 10$
- $\underline{\hspace{2cm}} = 0.5 \div 10$

Circle all the expressions below that are equivalent to 0.07:

- a. $0.7 \div 10$
- b. 7×10
- c. 0.7×10
- d. $7 \div 10$
- e. 0.007×10
- f. 0.07×10



Look at the patterns. Write the missing numbers.

- Multiply by ten: 0.003, _____, 0.3, _____, 30, 300
- Divide by ten: 900, _____, 9, 0.9, 0.09, _____
- Make up your own:

_____ / _____ / _____ / _____ / _____ / _____

NAME _____

DATE _____

NUMBER RELATIONSHIPS

Read the directions for each section and solve.

Fill in the blanks to make each equation true.

- $60 = \underline{6} \times 10$
- $0.6 = \underline{0.06} \times 10$
- $0.06 = \underline{0.006} \times 10$
- $6 = \underline{0.6} \times 10$
- $\underline{0.005} = 0.0005 \times 10$
- $\underline{0.005} = 0.05 \div 10$
- $\underline{5} = 0.5 \times 10$
- $\underline{0.05} = 0.5 \div 10$

Circle all the expressions below that are equivalent to 0.07:

- a. $0.7 \div 10$
- b. 7×10
- c. 0.7×10
- d. $7 \div 10$
- e. 0.007×10
- f. 0.07×10



Look at the patterns. Write the missing numbers.

- Multiply by ten: 0.003, 0.03, 0.3, 3, 30, 300
- Divide by ten: 900, 90, 9, 0.9, 0.09, 0.009
- Make up your own: **Responses will vary.**

_____ / _____ / _____ / _____ / _____ / _____

NAME _____

DATE _____



PARTY PLANNER



Make a list of 10 items you could purchase for a party. Look through magazines, advertisements, newspapers, or use the Internet to find prices of food and party supplies. Then, organize your list in order from least to most expensive.


List 10 Items:


| | | | |
|----|-------|---|-------|
| 1 | _____ | = | _____ |
| 2 | _____ | = | _____ |
| 3 | _____ | = | _____ |
| 4 | _____ | = | _____ |
| 5 | _____ | = | _____ |
| 6 | _____ | = | _____ |
| 7 | _____ | = | _____ |
| 8 | _____ | = | _____ |
| 9 | _____ | = | _____ |
| 10 | _____ | = | _____ |

Sort Prices (Least to Greatest)

| | |
|----|-------|
| 1 | _____ |
| 2 | _____ |
| 3 | _____ |
| 4 | _____ |
| 5 | _____ |
| 6 | _____ |
| 7 | _____ |
| 8 | _____ |
| 9 | _____ |
| 10 | _____ |

Choose two prices. Show how to multiply and divide by ten:

 _____ : _____ x 10 = _____ ÷ 10 = _____

 _____ : _____ x 10 = _____ ÷ 10 = _____

NAME _____

DATE _____

TIC-TAC-TOE

Play this game with a partner. Draw an X or an O on a number space. Then multiply or divide by the number shown at the top of the tic-tac-toe board. Write your new number on scrap paper. The first player to get three in a row wins!

| Multiply by 10 | | |
|----------------|-------|-------|
| 9.87 | 0.5 | 0.03 |
| 8.1 | 4.7 | 0.12 |
| 0.07 | 0.004 | 0.008 |



| Divide by 10 | | |
|--------------|-----|------|
| 5.4 | 1.7 | 32 |
| 91 | 0.8 | 0.01 |
| 8.4 | 20 | 6.0 |

| Multiply by 100 | | |
|-----------------|-------|-------|
| 8.2 | 4.8 | 1.9 |
| 0.075 | 0.002 | 0.426 |
| 0.001 | 0.87 | 0.03 |

