

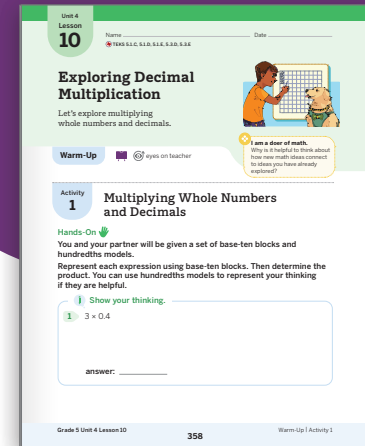


Student Edition pages and Presentation Screens support learning in this lesson.

# Exploring Decimal Multiplication

## Making Sense of Decimal Multiplication

Let's explore multiplying whole numbers and decimals.



### Key Concepts

#### Today's Goals

- Goal:** Multiply whole numbers and decimals less than 1 to the hundredths using any representation or strategy.
- Language Goal:** Compare different strategies for multiplying a whole number and a decimal to the tenths or hundredths. **(Listening and Speaking)**

**ELPS 1.E, 2.E, 2.F**

### Connections and Coherence

Students apply their understanding of whole number multiplication to represent and solve multiplication of whole numbers and decimals less than 1. The number cases are limited to decimals that have some tenths or some hundredths. Students are encouraged to use any strategy that makes sense to them and are provided with base-ten blocks and hundredths models to use. **(TEKS 5.1.C, 5.1.D, 5.1.E)**

#### < Prior Learning

In Grade 4, students represented the product of 2 two-digit numbers using arrays, area models, or equations, including perfect squares through 15 by 15.

#### > Future Learning

In Lesson 11, students will use multiple strategies to determine the product of a whole number and decimals greater than and less than 1.

### Integrating Rigor in Student Thinking

- Students **apply** their understanding of whole number multiplication to multiply whole numbers and decimals greater than and less than 1.

### Vocabulary

#### Review Vocabulary

*decimal*

### TEKS

#### Addressing

##### 5.3.D

Represent multiplication of decimals with products to the hundredths using objects and pictorial models, including area models.

*Also Addressing:* **5.3.E**

**Math Process Standards:** 5.1.C, 5.1.D, 5.1.E

**ELPS:** 1.B, 1.E, 2.B, 2.C, 2.D, 2.E, 2.F

#### Building On

**4.4.C**

#### Building Toward

**6.3.E**

### Building Math Identity

#### I am a doer of math.

Why is it helpful to think about how new math ideas connect to ideas you have already explored?

Invite students to reflect on this question as they complete this lesson.

# Lesson at a Glance ⌚ 60 min

🇺🇸 **TEKS: 5.1.C, 5.1.D, 5.1.E, 5.3.D, 5.3.E**

**Warm-Up** Fluency  
👤 **Whole Class** | ⌚ **10 min**

Students use the **How Many Do You See?** routine, in which they look at and describe the different ways they see different arrangements of units that represent 1 or 0.1.



**Activity 1**  
👤 **Pairs** | ⌚ **35 min**

Students use any strategy to multiply whole numbers by a number of tenths or a number of hundredths. They compare different representations and strategies, connecting their work to multiplying whole numbers.

**Manipulative Kit:** base-ten blocks  
**Materials:** *Hundredths Models* PDF (optional)



**Synthesis**  
👤 **Whole Class** | ⌚ **10 min**

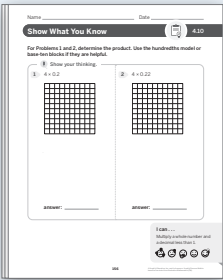
Students review and reflect on the size of products when multiplying a whole number by a decimal less than 1.



**Show What You Know**  
👤 **Independent** | ⌚ **5 min**

Students demonstrate their understanding by multiplying a whole number and a decimal less than 1.

**Manipulative Kit:** base-ten blocks (as needed)  
**Materials:** *Show What You Know* PDF



## Math Language Development

### EB Emergent Bilinguals

Consider using the *Math Language Development Resources* with the **Activity 1, Monitor** to support math language acquisition.

- ✓ Cognates
- ✓ Sentence frames and word bank
- ✓ Visuals

🇺🇸 **ELPS 1.E, 2.C, 2.D, 2.E, 2.F**



#### Pre-Production

Students **listen** to spoken English and **respond** using their primary languages and gestures.

#### Beginning

Students **listen** to spoken English and **speak** using their primary languages, gestures, and single words or short phrases.

#### Intermediate

Students **listen** to spoken English and **speak** using short phrases or simple sentences.

#### High Intermediate

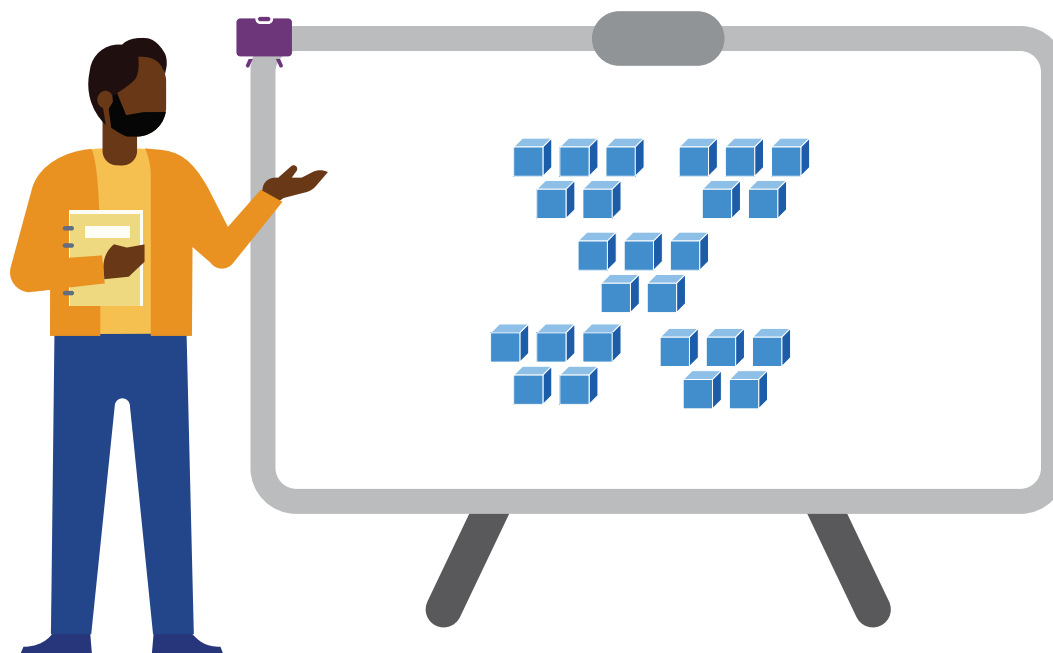
Students **listen** to spoken English and **speak** using a variety of sentence types.

#### Advanced

Students **listen** to spoken English and **speak** using longer sentences.  
Exemplar responses are provided.

# Warm-Up How Many Do You See? Fluency

**Purpose:** Students determine the number of units when the units are arranged in equal-sized groups. This prepares them to explore multiplication with decimals in this lesson.



**Why this image?** This image lends itself to seeing equal groups as multiplication.

## 1 Launch

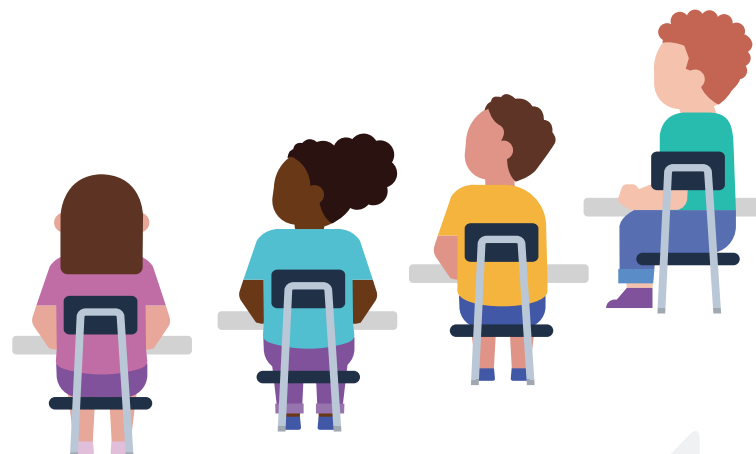
Use the **How Many Do You See?** routine.

**Display** the image and ask, “How many do you see? How do you see them?”

## 2 Connect

**Record** students’ responses as they share, honoring all explanations and keeping responses displayed.

**Ask** (if not yet mentioned during discussion), “Where do you see multiplication in this image?”



**Students might say . . .** ELPS 2.C, 2.D

*I see 5 groups of 5 ones.*

*I see 5 groups of 5 hundredths.*

*Because 5 groups of 5 is 25, I see 25.*

*I see 25 hundredths because there are 5 groups of 5 hundredths.*

# Activity 1 Multiplying Whole Numbers and Decimals

**Purpose:** Students use base-ten blocks and area models to determine the product of a whole number and a decimal.

## Materials

### Lesson Resources:

- Provide students with access to the *Hundredths Models* PDF (optional).

### Manipulative Kit:

- Provide students with access to 12 base-ten units, one hundreds flat, and 12 tens rods. (optional)

**Short on time?** Consider completing Problem 5 as a class.

## 1 Launch



**Read aloud** the introduction and directions. **ELPS 1.E**

**Ask**, “Will the product be greater than or less than the factors? Why does that make sense?”

**Say**, “Complete Problems 1–5 with your partner. Then join another pair to complete Problem 6.”

**Provide** access to base-ten blocks and the *Hundredths Models* PDF.

**A Accessibility: Visual-spatial processing** Guide visualization by having students begin with modeling the second factor in Problem 1 and drawing a corresponding diagram in their workspace.

## 2 Monitor



After students have completed **Problem 2**, refer to the **D Differentiation | Teacher Moves** table on the following page.

**If students need help getting started . . .**

- Ask, “What does the multiplication expression represent?”
- Ask, “How can you build 3 groups of 0.4 with base-ten blocks?”

## 3 Connect



**MLR** This Connect is structured using the *MLR7: Compare and Connect* routine. **ELPS 1.B, 1.E, 2.B, 2.D, 2.E**

**Invite students to share** their representations and strategies for Problem 2 using base-ten blocks.

**Record** students' representations and strategies.

**Use the Think-Pair-Share routine.** Ask:

- “How are these strategies similar? How are they different?”
- “Did you use the same strategy to solve each problem? Why or why not?”
- “How was your thinking similar to your work with multiplying whole numbers?”

**EB Emergent Bilinguals** Use wait time to allow students to formulate and rehearse their responses, in their own words, before sharing with the class. **ELPS 1.E, 2.D, 2.F**

**Key Takeaway:** Say, “When multiplying a whole number and a decimal, 1 way to represent the product is with equal groups using base-ten blocks or a hundredths model. The whole number in the expression can be used to represent the number of equal groups and the decimal can be used to represent the number in each group. Then you can find the total value of the base-ten blocks or the total value shaded on the hundredths model to determine the product.”

Unit 4  
Lesson  
10

Name \_\_\_\_\_ Date \_\_\_\_\_  
TEKS 5.1.C, 5.1.D, 5.1.E, 5.3.D, 5.3.E

## Exploring Decimal Multiplication

Let's explore multiplying whole numbers and decimals.



**I am a doer of math.**  
Why is it helpful to think about how new math ideas connect to ideas you have already explored?

### Warm-Up

eyes on teacher

### Activity 1

## Multiplying Whole Numbers and Decimals

### Hands-On

You and your partner will be given a set of base-ten blocks and hundredths models.

Represent each expression using base-ten blocks. Then determine the product. You can use hundredths models to represent your thinking if they are helpful. **Sample work shown.**

### Show your thinking.

1  $3 \times 0.4$

4 tenths + 4 tenths + 4 tenths = 12 tenths

answer: 1.2

### Activity 1

Name \_\_\_\_\_ Date \_\_\_\_\_

## Multiplying Whole Numbers and Decimals (continued)

### Show your thinking.

2  $3 \times 0.04$

12 hundredths  
= 1 tenth + 2 hundredths

answer: 0.12

3  $5 \times 0.4$

$5 \times \frac{4}{10} = \frac{20}{10}$   
 $\frac{20}{10} = 2$

answer: 2

4  $12 \times 0.02$

12  $\times$  2 hundredths  
= 24 hundredths  
24 hundredths = 0.24

answer: 0.24

5 At market day, Kara sold 9 miniature unicorns for \$0.70 each. How much money did she make from selling miniature unicorns?

9  $\times$  7 tenths = 63 tenths  
63 tenths = 6.3 = \$6.30

answer: \$6.30

6 **Discuss** **Oral activity: No writing expected.**

Join with another pair.

How are your strategies for Problems 1–5 similar? How are they different?

## D Differentiation | Teacher Moves



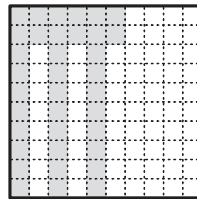
Presentation Screens

Look for students who ...

For example ...

Provide support ...

Use grids.



**S Strengthen** Ask, "How could you multiply without using a model?"

Use repeated addition.

$0.04 + 0.04 + 0.04 = 0.12$   
or  
4 hundredths + 4 hundredths +  
4 hundredths = 12 hundredths  
or 0.12

**S Strengthen** Ask, "Would you use the same strategy when multiplying  $14 \times 0.03$ ? Why or why not?"

Use fractions.

$3 \times \frac{4}{100} = \frac{12}{100}$  or 0.12

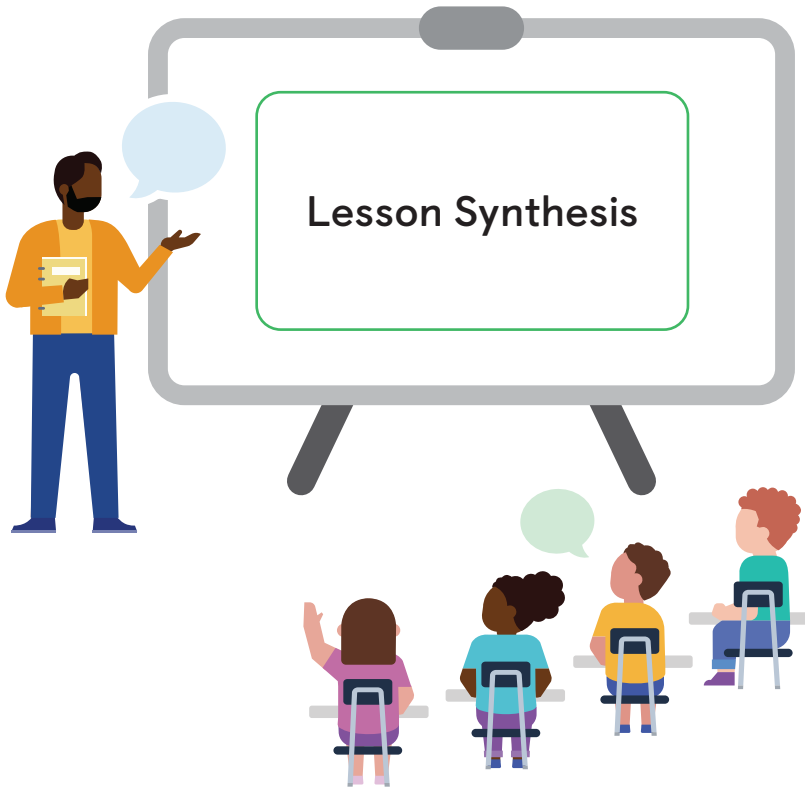
**S Stretch** Ask, "How can you predict whether the product will be greater or less than 1?"

Use whole number facts.

$3 \times 4 = 12$ , so  $3 \times 4$  hundredths =  
12 hundredths

# Synthesis

**Lesson Takeaway:** Base-ten blocks and hundredths models can be useful tools for determining the product of a whole number and a decimal.



**Say,** “Here is an incorrect equation.”

**Use the Think-Pair-Share routine.** Ask, “Why does the product 0.2 not make sense?”

**Ask,** “How could you use a base-ten blocks or a hundredths model to prove that 0.2 is not 5 times as many as 0.4?”

**Say,** “Just like when multiplying a whole number and a fraction less than 1, when multiplying a whole number and a decimal less than 1, the product will be less than the whole number and greater than the decimal factor.”

**Invite** students to refer to the **Summary** during Practice or anytime during the year.

## Show What You Know

Independent | 5 min

Students  
using digital

Lesson 10  
Show What  
You Know

### Show What You Know PDF

Name \_\_\_\_\_ Date \_\_\_\_\_

**Show What You Know** 4.10

For Problems 1 and 2, determine the product. Use the hundredths model or base-ten blocks if they are helpful. *Sample work shown.*

1 Show your thinking.

1  $4 \times 0.2$

or

$4 \times 2 \text{ tenths} = 8 \text{ tenths}$

answer: 0.8

2  $4 \times 0.22$

or

$4 \times 2 \text{ tenths} = 8 \text{ tenths}$   
 $4 \times 2 \text{ hundredths} = 8 \text{ hundredths}$   
 $0.8 + 0.08 = 0.88$

answer: 0.88

I can ...  
Multiply a whole number and a decimal less than 1.

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### Today's Goals

- Goal:** Multiply whole numbers and decimals less than 1 to the hundredths using any representation or strategy.
  - In the *Show What You Know*, students used base-ten blocks, hundredths grids, and/or area models to multiply whole numbers and decimals less than 1.
- Language Goal:** Compare different strategies for multiplying a whole number and a decimal to the tenths or hundredths. **(Listening and Speaking)** 🗣️ **ELPS 1.E, 2.E, 2.F**

D

**Differentiation**

See the last page of the lesson for differentiation and Math Language Development support.

# Practice Independent

Provide students with sufficient practice to build and reinforce their conceptual understanding, fluency, and application of mathematical topics, assessment practice, and ongoing spiral review.



Students using print

Summary 4.10

Multiplying with decimals is similar to multiplying with whole numbers. You can use base-ten blocks and models to represent your thinking.

$3 \times 0.33$

$3 \times 0.3 = 0.9$   
 $3 \times 0.03 = 0.09$   
 $3 \times 0.33 = 0.99$

Practice 4.10

For Problems 1 and 2, use the number bank.

Number Bank

4.0    0.4    0.04    2.4    0.24    24

1

Make the equation true.  $4.0 \times 0.6 = 2.4$

2

Make the equation true.  $0.4 \times 0.6 = 0.24$

Grade 5 Unit 4 Lesson 10

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Summary | Practice

Students using digital

Practice 4.10

Name \_\_\_\_\_ Date \_\_\_\_\_

For Problems 3–5, determine the value of the expression. You can use the hundredths model to represent your thinking if it is helpful. Sample work shown.

3

Show your thinking.

$2 \times 0.5$

$2 \text{ groups of } 5 \text{ tenths is } 10 \text{ tenths, or } 1.$

or

answer: 1

4

$2 \times 0.04$

$2 \times 4 \text{ hundredths} = 8 \text{ hundredths}$

or

answer: 0.08

Grade 5 Unit 4 Lesson 10

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Practice

Practice 4.10

Name \_\_\_\_\_ Date \_\_\_\_\_

5

$6 \times 0.1$

$6 \times \frac{1}{10} = \frac{6}{10} = 0.6$

or

answer: 0.6

Spiral Review

6 What is the perimeter of a rectangular garden that is  $2\frac{1}{2}$  feet by  $6\frac{1}{4}$  feet?

Show your thinking.

$2\frac{1}{2} + 2\frac{1}{2} + 6\frac{1}{4} + 6\frac{1}{4} = 5 + 12\frac{2}{4}$   
 $= 17\frac{2}{4} = 17\frac{1}{2}$

answer:  $17\frac{1}{2}$  feet

For Problems 7–10, determine the value of the expression.

7  $4 \times 4$  16

8  $2 \times 7$  14

9  $35 \div 7$  5

10  $15 \div 5$  3

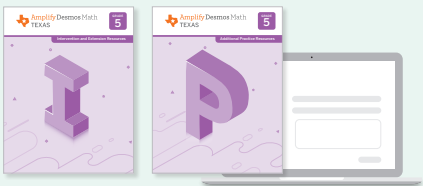
Grade 5 Unit 4 Lesson 10

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Practice

Practice Problem Item Analysis			
	Problem(s)	DOK	TEKS
On-Lesson			
Test Practice	1, 2	2	5.3.E
	3–5	2	5.3.D, 5.3.E
Spiral Review			
Fluency	6	1	5.3.K, 5.4.H
	7, 8	1	4.4.D
	9, 10	1	4.4.E

## Need more Practice?



Additional practice can be found in the **Practice Resources**, **Intervention and Extension Resources**, and online resources (item banks, Boost Personalized Learning, and Fluency Practice).

**Lesson Goal:** Multiply whole numbers and decimals less than 1 to the hundredths using any representation or strategy.

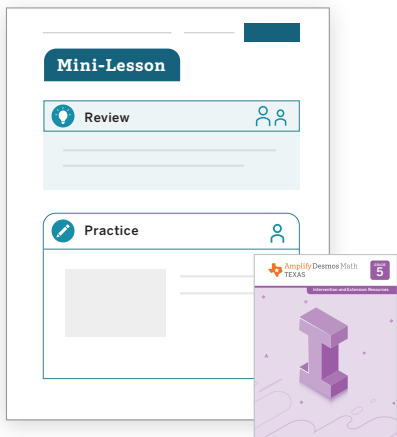
## S Support

Provide targeted intervention for students by using these resources.

**If students** multiply whole numbers and decimals using only base-ten blocks:

### Respond:

- Assign the *Connecting Whole Number and Decimal Multiplication Mini-Lesson*. | ⌚ 15 min
- Review strategies for multiplying different place values.
- Students will also have more opportunities to develop this concept in future lessons, so intervention is not necessary at this time.



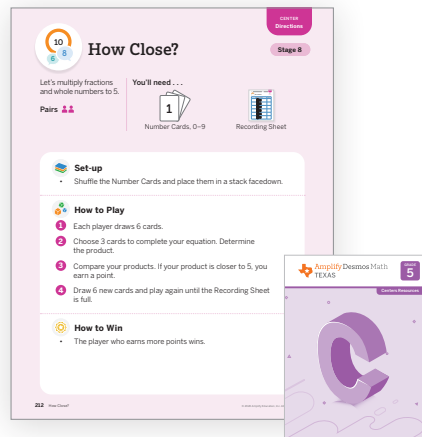
## S Strengthen

Reinforce students' understanding of the concepts assessed by using these resources.

**If students** multiply whole numbers and decimals using the hundredths model:

### Respond:

- Invite students to play this **Center**. | ⌚ 15 min  
*How Close?:*  
*Multiply to 100*  
*Multiply to 3,000*  
**Match It: Multiplication Representations**
- Have students complete **Lesson 10 Practice**. | ⌚ 15 min
- Item Bank**



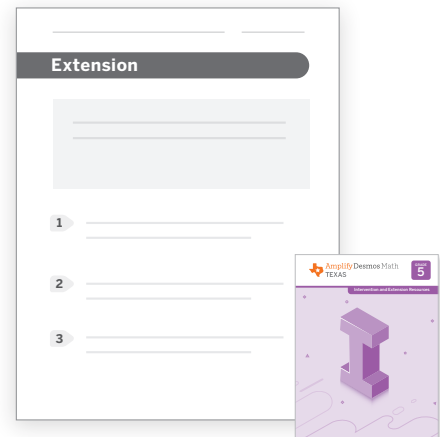
## S Stretch

Challenge students and extend their learning with these resources.

**If students** multiply whole numbers and decimals using different strategies or representations:

### Respond:

- Invite students to explore the **Sub-Unit 2 Extension Activities**. | ⌚ 15 min
- Revisit Activity 1 and invite students to respond to the **Stretch** question from the *Differentiation: Teacher Moves* table. | ⌚ 5 min



*Support, Strengthen, and Stretch* learning by assigning these digital resources that adjust to each student's current level of skill and understanding.

• **Boost Personalized Learning** • **Fluency Practice** • **Math Adventures**

## Math Language Development

**EB** Use the **Math Language Development Resources** for further language support with all your students, including those building English proficiency.

- English/Spanish cognates
- Frayer Model templates
- Vocabulary routines



### Professional Learning

Identify who has been sharing their ideas in class lately. Make a note of students whose ideas have not been shared and look for an opportunity for them to share their thinking in the next lesson.