



# Divide Whole Numbers by 0.1 and 0.01

## Standards

Addressing 5.NBT.B.7, 5.NF.B.7.b  
Building Toward 5.NBT.A.1


## Instructional Routines

- MLR1 Stronger and Clearer Each Time
- Number Talk

## Goals

- Explain (orally and in writing) strategies for dividing a whole number by 0.1 or 0.01 and critique (orally) explanations.
- Generalize (orally and in writing) that dividing a whole number by 0.1 is equivalent to multiplying it by 10, and dividing a whole number by 0.01 is equivalent to multiplying it by 100.

## Student Facing Learning Goals

 Let's divide whole numbers by one tenth and one hundredth.

## Lesson Purpose

The purpose of this lesson is for students to notice and explain patterns when dividing a whole number by one tenth and one hundredth.

## Narrative

In prior lessons, students represented decimals to the thousandths with diagrams, words, numbers, and expressions. They also added, subtracted, and multiplied decimals using place value understanding, properties of operations, and relationships between operations. In this lesson, students begin to work with decimals and division. They divide whole numbers by one tenth and one hundredth and notice and explain patterns they observe. Students apply their understanding of division as “how many groups” to hundredths grids where the entire grid represents one whole. This allows students to visualize how many tenths or hundredths are in one or several wholes while also preparing them to find quotients of more complex decimals in future lessons.

## Access for Students with Disabilities

- Representation

## Required Materials

### Materials to Copy

- Small Grids Handout (1 copy for every 1 students): Activity 1
- Small Grids Handout (1 copy for every 1 students): Activity 2



## Lesson Timeline

Warm-up	10 min
Activity 1	15 min
Activity 2	20 min
Synthesis Estimate	10 min
Cool-down	5 min

## Teacher Reflection Questions

Reflect on how comfortable your students are asking questions of you and of each other. What can you do to encourage students to ask more questions?

## Warm-up

 10 min

Number Talk: Remember Division of Unit Fractions

### Standards

Addressing 5.NBT.B.7, 5.NF.B.7.b

### Instructional Routines

- Number Talk

The purpose of this *Number Talk* is for students to divide a whole number by a tenth and a hundredth, presented both as fractions and as decimals. This prepares students to work with and understand quotients of whole numbers by decimals in this and future lessons.

### Student Task Statement

Find the value of each expression mentally.

- $1 \div \frac{1}{10}$
- $2 \div \frac{1}{10}$
- $1 \div 0.01$
- $2 \div 0.01$

### Launch

- Display one problem.
- “Give me a signal when you have an answer and can explain how you got it.”
- 1 minute: quiet think time

### Activity

- Record answers and strategy.
- Keep problems and work displayed.
- Repeat with each problem.

### Student Response

- 10: There are 10 tenths in 1 whole.
- 20: There are twice as many tenths in 2 wholes.
- 100: There are 100 hundredths in 1 whole.
- 200: There are twice as many hundredths in 2 wholes.

### Activity Synthesis

- “What is the same about these expressions? What is different?” (They all show a whole number divided by a number less than 1. Some have decimals and some have fractions, but the decimals and fraction are all 1 of some unit. They all have a value that is a whole number.)



# Activity 1

## Patterns in Dividing by Decimal Units

 15 min  
 PLC Activity

### Standards

Addressing 5.NBT.B.7

The purpose of this activity is for students to divide a whole number by 0.1 or 0.01. Students may think about the quotients in different ways. Monitor for students who:

- Use the hundredths grids to visualize the tenths and hundredths in 3 or 4 wholes.
- Use their understanding of fractions or decimals to identify the number of tenths and hundredths in 1 whole and then multiply by the number of wholes.
- Build on and solidify their reasoning from the *Warm-up*.

In this activity, focusing on the tenths and hundredths in 3 or 4 wholes prepares students to generalize in the next activity where they explain how to find the number of tenths or hundredths in any whole number.

### Access for Students with Disabilities

- | *Representation: Internalize Comprehension.* Begin by asking, “Does this problem/situation remind anyone of something we have seen/read/done before?”
- | *Supports accessibility for: Memory, Attention*

### Required Materials

#### Materials to Copy

- Small Grids Handout (1 copy for every 1 students):  
Activity 1

### Student Task Statement

1. Find the value of each expression. Explain or show your reasoning. Use a diagram if it is helpful.
  - a.  $3 \div 0.1$
  - b.  $3 \div 0.01$
  - c.  $4 \div 0.1$
  - d.  $4 \div 0.01$
2. What patterns do you notice?

### Launch

- Groups of 2
- Give students access to blackline masters with grids.

### Activity

- 1–2 minutes: quiet think time
- 5–7 minutes: partner work time
- Monitor for students who:
  - Use fractions.
  - Use diagrams.
  - Use multiplication.

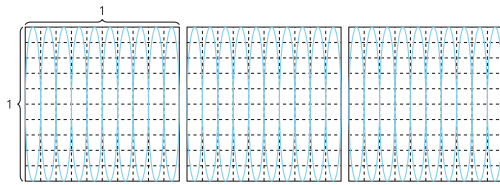
### Student Response

1. a. 30. Sample responses:
  - There are 10 tenths in 1 so there are 30 tenths in 3.

### Activity Synthesis

- Ask previously selected students to share their

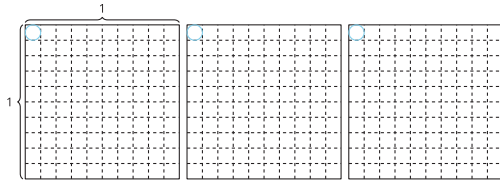




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- $10 \times 0.1 = 1$ ,  $20 \times 0.1 = 2$ ,  $30 \times 0.1 = 3$

b. 300. Sample responses:

- There are 100 hundredths in 1 so there are 300 hundredths in 3. I just circled one of the hundredths on each grid but know there are 100 of them.



- $100 \times 0.01 = 1$ ,  $200 \times 0.01 = 2$ ,  
 $300 \times 0.01 = 3$

c. 40. Sample response: There are 10 tenths in 1 so there are 40 tenths in 4,  $40 \times 0.1 = 4$ .

d. 40. Sample response: There are 100 hundredths in 1 so there are 400 hundredths in 4,  $400 \times 0.01 = 4$ .

2. Sample responses: When I divide by a tenth, I get ten times as much. When I divide by a hundredth, I get 100 times as much. Dividing by 0.01 is 10 times as much as dividing by 0.1.

strategies for finding the value of the division expressions.

- “How do the different representations show that there are 10 tenths in 1 whole and 100 hundredths in 1 whole?” (With the diagram. I can see each tenth and each hundredth in the whole. With fractions or decimals, I just know how many tenths or hundredths there are in 1 and I can use that to figure out how many there are in 3 or 4.)
- Display equations:  
 $3 \div 0.1 = 30$   
 $4 \div 0.1 = 40$
- “What patterns do you notice?” (I notice that I multiply by 100 to find how many 0.01s there are in 3 or 4.)

## Activity 2

🕒 20 min

Divide Whole Numbers by Decimals

### 📖 Standards

Addressing **5.NBT.B.7**

Building Toward **5.NBT.A.1**

### 📣 Instructional Routines

- MLR1 Stronger and Clearer Each Time

The purpose of this activity is for students to describe the patterns they notice when they divide a whole number by one tenth and one hundredth (MP7). Students have the option of using a diagram recalling work from the previous activity. The reasoning students develop here prepares them to:

- Evaluate more complex quotients with decimals in future lessons.
- Observe patterns when multiplying or dividing by powers of 10 which will be a focus in the next unit.

This activity uses *MLR1 Stronger and Clearer Each Time*. Advances: Reading, Writing.



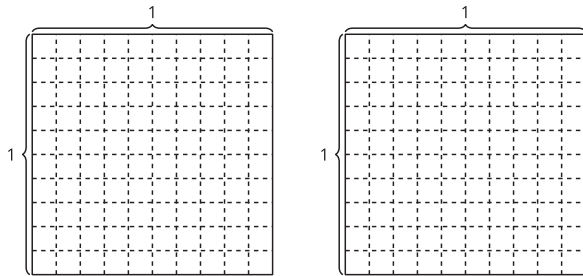
## Required Materials

### Materials to Copy

- Small Grids Handout (1 copy for every 1 students): Activity 2

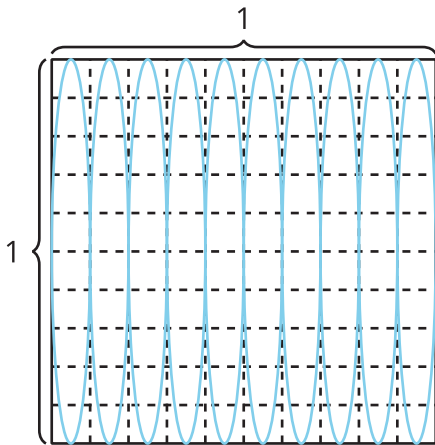
### Student Task Statement

1. Describe how you can find the value of any whole number divided by 0.1. Use a diagram if it is helpful.
2. Describe how you can find the value of any whole number divided by 0.01. Use a diagram if it is helpful.



### Student Response

1. Sample response: I can multiply the whole number by 10 if I am dividing by one tenth. I can use the diagram to show why there are ten 0.1s in each whole.



2. Sample response: I can multiply the whole number by 100 if I am dividing by one hundredth. I can use the diagram to show why there are one hundred 0.01s in each whole though I only circled one of them.

### Launch

- Groups of 2
- Give students access to blackline masters with grids.
- “You are going to use the patterns you noticed to explain how to divide any whole number by a tenth and a hundredth.”

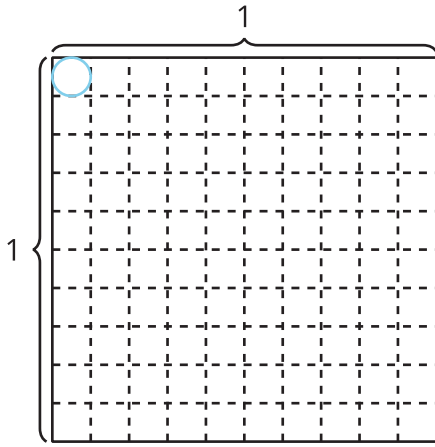
### Activity

- 6–8 minutes: independent work time
- Monitor for students who notice:
  - When they divide a whole number by one tenth, the quotient is ten times larger than the whole number.
  - When they divide a whole number by one hundredth, the quotient is one hundred times larger than the whole number.

### Activity Synthesis

#### MLR1 Stronger and Clearer Each Time

- “Share with your partner your explanation of how you would find the value of
  - Any whole number divided by one tenth.
  - Any whole number divided by one hundredth.”
- “Take turns being the speaker and the listener. If you are the speaker, share your ideas and writing so far. If you are the listener, ask questions and give feedback to help your partner improve their work.”
- 2 minutes: structured partner discussion
- Repeat with 2 different partners.
- If needed, display question starters and prompts for feedback.
  - “Can you give an example to help show . . . ?”
  - “Can the examples we studied in the first activity fit in your explanation?”
- “Revise your initial draft based on the feedback you got from your partners.”



- 2–3 minutes: independent work time

## Lesson Synthesis

“Today, we divided whole numbers by one tenth and one hundredth.”

Display  $5 \div 0.1$  and  $5 \div 0.01$ .

“Describe to your partner how to find the value of each of these expressions.” (To divide by 0.1, I just multiply by 10 so that’s 50 and to divide by 0.01 I multiply by 100.)

“Now, discuss with your partner why your strategy works.” (There are 10 tenths in 1 so that’s  $5 \times 10$  or 50 in 5. There are 100 hundredths in 1 so that’s  $5 \times 100$  or 500 in 5.)

## Suggested Centers

- Compare (1–5), Stage 5: Divide within 100 with One and Two-Digit Divisors (Supporting)
- Compare (1–5), Stage 7: Add and Subtract Fractions (Supporting)

## Cool-down

5 min

Many Tenths and Hundredths

### Standards

Addressing 5.NBT.B.7

### Student Task Statement

Find the value of each expression. Explain or show your reasoning.

1.  $7 \div 0.1$
2.  $7 \div 0.01$



## Student Response

1. 70. Sample response:  $1 \div 0.1 = 10$  and  $7 \times 10 = 70$
2. 700. Sample response: There are 100 hundredths in 1, so there are 700 hundredths in 7.

## Responding to Student Thinking

Students find values other than 70 and 700 for the expressions.

### Next Day Supports

Throughout the lesson, ask, "How does this connect to the work you did in yesterday's lesson?"

