

### Lesson #4: Decimals

#### Objectives

**Students will be able to...**

- Understand the importance of decimals in construction and how it is linked to the metric system by using meters, centimeters, and millimeters.

#### Common Core Standards

Number Sense 1.2, 1.3, & 3.1  
Cabinet Making and Wood Products Pathway 1.4

#### Materials

Decimals Notes and Practice  
Conversion Chart  
Decimals Exit Ticket

#### Lesson Sequence

- Review the *Decimal notes and practice* with the class. There are practice problems within the notes to work out together and practice as a class. (35 minutes)
- Pass out the *Conversion chart* and review with students. (5 minutes)
- *Decimals Exit Ticket*. (10 minutes)

#### Assessment

Review scores on the decimal exit ticket. Use this data as a tool to see which students are grasping the concept and which students may still need support.

#### Accommodations/Modifications

Calculator  
One on one support  
Peer support

## Decimal Notes and Practice

### What is a decimal?

The decimal notation is the writing of numbers in a base-10 numerical system.

A decimal is a fractional part of a whole number.

There are two types of decimal numbers:

1. Proper decimals contain no whole numbers. The number .375 is an example of a proper decimal.
2. Mixed decimals contain both whole numbers and decimal numbers. 4.25 is an example of a mixed decimal.

### Place Value

Decimals are expressed as follows:

.1	= Tenths
.01	= Hundredths
.001	= Thousandths
.0001	= Ten-thousandths
.00001	= Hundred-thousandths
.000001	= Millionths

The monetary system of the United States is based on the **decimal system**:

CURRENCY	VALUE	DECIMAL	FRACTION
Dollar	\$1.00	1.00	100/100
Half-dollar	\$ .50	.50	50/100
Quarter	\$ .25	.25	25/100
Dime	\$ .10	.10	10/100
Nickel	\$ .05	.05	5/100
Penny	\$ .01	.01	1/100

**Reading Decimals**

Orally, decimals are described in different ways. The *correct* way to say a decimal is to read the number and add the correct “th” word to signify place value.

Example: .75 is spoken as “75 hundredths”, but on the job you may hear it spoken as “point seven five” or “point seventy-five.”

Mixed decimals can be described the same way. Read the whole number. Then read “and” for the decimal point and then read the decimal, stating the place value. The *correct* way to read 3.14, for example, is to say 3 and 14-hundredths. But on the job you may hear it spoken as “three point one four” or “three point fourteen”.

Write out the following decimals *correctly*:

1. .65

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2. .065

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3. .0065

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Write the correct way to say the mixed decimal 9.25 in the space provided below:

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**Converting Decimals to Fractions**

Any decimal can be converted to a fraction.

Step 1: Write the decimal as a fraction by writing the number divided by the place value.

Examples:  $.25 = 25/100$       $.07 = 7/100$       $.7 = 7/10$       $.125 = 125/1000$

Step 2: Find a common factor, if any, for the numerator and denominator

**Convert the following proper decimals into fractions:**

1. .5 \_\_\_\_\_

3. .625 \_\_\_\_\_

2. .25 \_\_\_\_\_

4. .75 \_\_\_\_\_

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Mixed decimals are converted the same way. The only difference is that you ignore the whole number and simply convert the decimal.

For example:  $1.75 = 1\frac{75}{100}$ .  $\frac{75}{100} = \frac{3}{4}$ . So,  $1.75 = 1\frac{3}{4}$ .

How did we get from 1.75 to  $1\frac{3}{4}$ ?

Step 1: Ignoring the whole number, determine any common factors that the numerator and the denominator share.

The numbers 75 and 100 share 25 as a common factor.

Step 2: Divide the numerator and the denominator by 25.

Step 3: This leaves us with the fraction  $\frac{3}{4}$ . Since 3 and 4 have no common factors, they cannot be reduced any further. Therefore,  $.75 =$  the fraction  $\frac{3}{4}$ .

Step 4: Add the whole number back to the fraction ( $1\frac{3}{4}$ ) and you're finished.

**Convert the following mixed decimals into mixed fractions:**

1. 1.5 \_\_\_\_\_

2. 32.375 \_\_\_\_\_

3. .125 \_\_\_\_\_

Just as any decimal can be converted to a fraction, any fraction can be converted into a decimal.

In order to convert a fraction to a decimal, all you have to do is divide the numerator by the denominator. The quotient will be in decimal form.

For example:  $\frac{7}{8} = .875$  How did we get from  $\frac{7}{8}$  to .875?

Step 1: Divide the numerator (7) by the denominator (8):  $\frac{7}{8}$  Step 2:  $\frac{7}{8} = .875$

**Convert the following proper fractions into decimals:**

1.  $\frac{1}{2}$  \_\_\_\_\_

3.  $\frac{1}{16}$  \_\_\_\_\_

2.  $\frac{3}{8}$  \_\_\_\_\_

4.  $\frac{8}{20}$  \_\_\_\_\_

Mixed fractions are converted the same way. Ignore the whole number and convert the fraction. For example:  $3\frac{3}{4} = 3.75$  How did we get from  $3\frac{3}{4}$  to 3.75?

Step 1: Ignoring the whole number, divide the numerator (3) of the fraction by the denominator (4):  $\frac{3}{4}$

Step 2:  $\frac{3}{4} = .75$

Step 3: Add the whole number back to the fraction (1.75) and you're finished.

**Convert the mixed fractions into mixed decimals:**

1.  $22\frac{21}{32}$  \_\_\_\_\_

2.  $4\frac{9}{16}$  \_\_\_\_\_

3.  $17\frac{4}{8}$  \_\_\_\_\_

\*\*It is important to note that in the construction industry, we typically round all decimals to the hundredths place. This means that the decimal .725 would round up to .73, and the decimal .724 would round to .72

## **A Final Note on Decimals**

Decimals can also be categorized 3 ways.

1. **Irrational Numbers:** These are decimals that never stop, they just keep going on randomly forever. An example of this is  $3.142857 . . . \infty$  This is the type of decimal you get when you convert the fraction  $3\frac{1}{7}$ . (For calculator purposes, we say it is 3.14)
2. **Repeating Decimal:** A decimal that repeats itself over, and over, forever. An example of this is  $.09090909090909 . . . \infty$  This is the type of decimal you get when you convert the fraction  $\frac{1}{11}$ .
3. **Terminating Decimal:** A decimal that eventually comes to an end. An example of this is .5 This is the type of decimal you get when you convert the fraction  $\frac{1}{2}$ .

It is important to note that both the repeating and terminating decimals are rational numbers. What are rational numbers? Rational numbers are numbers that can be expressed as the quotient of two integers. What are integers? Integers are whole numbers that can have a positive (+) or negative (-) sign attached to them.

**Conversion Chart**

<u>Fraction</u>	<u>Decimal</u>	<u>Millimeters</u>	<u>Fraction</u>	<u>Decimal</u>	<u>Millimeters</u>
1/64	.0156	0.396	33/64	.5156	13.096
1/32	.0312	0.793	17/32	.5312	13.493
3/64	.0468	1.190	35/64	.5468	13.890
1/16	.0625	1.587	9/16	.5624	14.287
5/64	.0781	1.984	37/64	.5781	14.684
3/32	.0937	2.381	19/32	.5937	15.081
7/64	.1093	2.778	39/64	.6093	15.478
1/8	.125	3.175	5/8	.625	15.875
9/64	.1406	3.571	41/64	.6406	16.271
5/32	.1562	3.968	21/32	.6562	16.668
11/64	.1718	4.365	43/64	.6718	17.065
3/16	.1875	4.762	11/16	.6875	17.462
13/64	.2031	5.159	46/64	.7031	17.859
7/32	.2187	5.556	23/32	.7187	18.256
15/64	.2343	5.953	47/64	.7343	18.653
1/4	.250	6.350	3/4	.750	19.050
17/64	.2656	6.746	49/64	.7656	19.446
9/32	.2812	7.143	25/32	.7812	19.843
19/64	.2968	7.540	51/64	.7968	20.240
5/16	.3125	7.937	13/16	.8125	20.637
21/64	.3281	8.334	53/64	.8281	21.034
11/32	.3437	8.731	27/32	.8437	21.431
23/64	.3593	9.128	55/64	.8593	21.828
3/8	.375	9.525	7/8	.875	22.225
25/64	.3906	9.921	57/64	.8906	22.621
13/32	.4062	10.318	29/32	.9062	23.018
27/64	.4218	10.715	59/64	.9218	23.415
7/16	.4375	11.112	15/16	.9375	23.812
29/64	.4531	11.509	61/64	.9531	24.209
15/32	.4687	11.906	31/32	.9687	24.606
31/64	.4843	12.303	63/64	.9843	25.003
1/2	.500	12.700	1	1.000	25.400

### Decimals Exit Ticket

Convert the mixed fractions into mixed decimals:

1.  $2 \frac{5}{8}$  \_\_\_\_\_

2.  $4 \frac{3}{16}$  \_\_\_\_\_

3.  $15 \frac{6}{9}$  \_\_\_\_\_

Convert the following mixed decimals into mixed fractions:

1. 5.87 \_\_\_\_\_

2. 68.93 \_\_\_\_\_

3. 3.33 \_\_\_\_\_

Convert the following proper decimals into fractions:

1. .72 \_\_\_\_\_

2. .675 \_\_\_\_\_

3. .29 \_\_\_\_\_

4. .97 \_\_\_\_\_