Standard Deviants School
Basic Math

Working with Decimals
Lesson Plan

Module 6

Video: 15 minutes Lesson: 35 minutes

Pre-viewing

- **:00** *Warm up:* Get your students' mental math muscles going with a few arithmetic problems. Go over the lesson objectives.

4 minutes

Viewing

- **:04** *Playing Video:* Hand out the Viewing Guide. Instruct the students to follow along with the Viewing Guides and complete the math problems covered in the program. Don't hesitate to stop the program and review if the students seem confused.

15 minutes

Post-viewing

- **:19** *Question & Answer Session:* See if any parts of the program were difficult or confusing for the students. Hand out the Worksheet. As a class, complete the first problem from each section and review the arithmetic steps involved in finding the correct answer.

5 minutes

Handouts

- **:24** *Practicing Material:* Give the class 10 minutes to complete the Worksheet. Monitor the students' progress, helping where needed. Go over the answers as a class.

12 minutes

- **:36** *Applying Material:* Hand out the Activity and go over strategies for solving word problems. There is a small section on word problems on the Viewing Guide. Give the students 10 minutes to complete the Activity. Go over the answers as a class.

12 minutes

- **:48** *Wrap-up:* Assign any homework.

2 minutes

Teacher's Notes

Basic Math

Working with Decimals

Teacher's Reference Guide

Module 6

Video: 15 minutes Lesson: 35 minutes

Learning Objectives
At the end of the module, students will be able to:
- add, subtract, multiply, and divide using decimals
- round decimals to tenths, hundredths, and thousandths place
- use scientific notation

Materials
- *Video*: defining decimals, decimal operations, rounding decimals, scientific notation; 15 minutes
- *Viewing Guide:* sample problems
- *Worksheet*: 23 decimal problems
- *Activity:* 6 word problems
- *Check Your Knowledge:* decimal operations, word problems; 50 points

Background
Students should have completed Basic Math Modules 1, 2, 3, and 4 *(Integers & Addition, Subtracting Integers, Multiplying Integers,* and *Dividing Integers)* or their equivalents.

Standard Deviants School — Basic Math

Working with Decimals
Viewing Guide

Module 6

Show your work and solve the problems with the program!
Your teacher will be asking you for the answers!

Each digit place represents a power of ten (10).

263		**3.12**	
3	(*ones*)	3.00	(*ones*)
60	(*tens*)	.10	(*tenths*)
200	(*hundreds*)	.02	(*hundredths*)

- The decimal point is to the right of the units place.
- The decimal point represents the separation of the units place and the tenths place.

Multiplication

1. Put one number on top of another.
2. Multiply each digit of the bottom number times each digit of the top number.
3. Insert zeroes for each result where appropriate.
4. Add results together.
5. Count the total number of decimal places in both numbers.
6. Move your product's decimal point to the left by the number of decimal places you counted.

$$\begin{array}{r} 1.86 \\ \times\ 2.3 \\ \hline \end{array}$$

Rounding Decimals

Find the decimal point you want to round off to.

> 5: round up the digit
< 5: round down the digit

Rounding off to the ones place: 3.814 → **4**

Rounding off to the tenths place: 3.814 → **3.8**

Rounding off to the hundredths place: 3.814 → **3.81**

Word Problem Solving Strategies

Read	the problem.
Identify	what you must solve.
Out of here!	Remove all unnecessary information.
Translate	the word problem into a math problem; break it down into logical steps.
Solve	the problem.

Addition and Subtraction

The decimal points must line up.

Addition:	**Right**	**Wrong**
	56.30 + 7.89	56.30 + 7.84

Subtraction:
works the same way – just line up the decimal points.

Division

- move decimal point in divisor so last digit is in the units place: **0.5 ⟌ 1.45**
- move decimal point in dividend same number of places to the right: **5 ⟌ 14.5**
- divide:

$$\begin{array}{r} 2.9 \\ 5\overline{)14.5} \\ -10 \\ \hline 45 \\ -45 \\ \hline 0 \end{array}$$

- insert a decimal point into the answer above the decimal point in the dividend

Scientific Notation

- for numbers greater than one, move the decimal point to the LEFT, so the number being multiplied is between 1 and 10
- the number of places moved is the exponent

$144{,}000{,}000{,}000 = 1.44 \times 10^{11}$

- for numbers less than one, move the decimal place to the RIGHT, so the number being multiplied is between 1 and 10
- the number of places moved is the negative exponent

$0.0003789 = 3.789 \times 10^{-4}$

Standard Deviants School
Basic Math

Working with Decimals *Worksheet*

Module 6

A. Adding and Subtracting

Solve each problem. Show your work.

1. 10.5 + 12.08 =
2. 23.45 + 54.32 =
3. 72.431 + 27.569 =
4. 9.7 - 4.34 =
5. 16.32 - 8.9 =
6. 31.78 - 6.909 =

B. Multiplying and Dividing

Solve each problem. Show your work.

1. 2.64 x 5.2
2. $0.7\overline{)28.7}$
3. 10.01 x 5.05
4. $2.9\overline{)6.21}$

C. Rounding Decimals

Round each number to the ones place.	*Round to the tenths place.*	*Round to the hundredths place.*
1. 4.7	4. 8.93	7. 4.321
2. 2.3	5. 1.19	8. 9.876
3. 7.89	6. 9.999	9. 17.43578

D. Scientific Notation

Convert each decimal to proper scientific notation.

1. 135,000,000,000
2. 0.000000000472
3. 0.025
4. 875,000

Basic Math

Working with Decimals *Worksheet*

Answer Key

Module 6

A. Adding and Subtracting

Solve each problem. Show your work.

1. 10.5 + 12.08 = **22.58**
2. 23.45 + 54.32 = **77.77**
3. 72.431 + 27.569 = **100**
4. 9.7 - 4.34 = **5.36**
5. 16.32 - 8.9 = **7.42**
6. 31.78 - 6.909 = **24.871**

B. Multiplying and Dividing

Solve each problem. Show your work.

1. 2.64 x 5.2 = 528 + 1320 = 13728 (+3 decimal places) = **13.728**
2. 0.7 | 28.7 = **41**; 7 | 287; - 28; 7; 7; **0**
3. 10.01 x 5.05 = 5005 + 50050 = 505505 (+4 decimal places) = **50.55**
4. 2.9 | 6.21 = **2.14**; 29 | 62.1; - 58; 41; -29; 120; -116; **4**

C. Rounding Decimals

Round each number to the ones place.

1. 4.7 **5**
2. 2.3 **2**
3. 7.89 **8**

Round to the tenths place.

4. 8.93 **8.9**
5. 1.19 **1.2**
6. 9.999 **10**

Round to the hundredths place.

7. 4.321 **4.32**
8. 9.876 **9.88**
9. 17.43578 **17.44**

D. Scientific Notation

Convert each decimal to proper scientific notation.

1. 135,000,000,000 **1.35×10^{11}**
2. 0.000000000472 **4.72×10^{-10}**
3. 0.025 **2.5×10^{-2}**
4. 875,000 **8.75×10^{5}**

Standard Deviants School
Basic Math

Working with Decimals *Activity*

Module 6

Word Problems

1. Bartholomew Jackson is paid $8.35 an hour to knit dog sweaters. He gets paid 1.5 times his normal wages for overtime (over 40 hours per week). If he works 55.5 hours in one week, how much money does he earn?

2. Six friends go to a restaurant. The bill (plus tip) comes to $71.43. How much should each person pay, rounding to the nearest dollar?

3. The nearest star to us, Alpha Centauri, is 4.3 light years away. A light year is 5,865,696,000,000 miles. (This is why we use light years as a measurement of distance, guys. Space is big.) How far away is Alpha Centauri in miles? Express in scientific notation.

4. Americans eat an average of 1,200,000,000 pounds of hamburger each year. Assuming that each hamburger is a quarter-pounder, how many hamburgers do Americans eat each year? Express your answer in scientific notation.

5. Global Monster Bank makes 1/10 of a cent on each transaction it oversees. If the bank oversees 346,912 transactions in a day, how much money does it make?

Standard Deviants School
Basic Math

Working with Decimals *Activity*

Answer Key

Module 6

Word Problems

1. Bartholomew Jackson is paid $8.35 an hour to knit dog sweaters. He gets paid 1.5 times his normal wages for overtime (over 40 hours per week). If he works 55.5 hours in one week, how much money does he earn?

   40 hours x $8.35 = $334
   overtime wage = 8.35 x 1.5 = $12.52 per hour
   15.5 overtime hours x $12.52 = $194.13
   $334 base pay + $194.13 overtime pay = $528.13

2. Six friends go to a restaurant. The bill (plus tip) comes to $71.43. How much should each person pay, rounding to the nearest dollar?

   71.43 ÷ 6 = $11.90 R 3
   round $11.90 to $12

3. The nearest star to us, Alpha Centauri, is 4.3 light years away. A light year is 5,865,696,000,000 miles. (This is why we use light years as a measurement of distance, guys. Space is big.) How far away is Alpha Centauri in miles? Express in scientific notation.

   5,865,696,000,000 x 4.3 = 25,222,492,000,000 miles = 2.5 x 10^{13} miles

4. Americans eat an average of 1,200,000,000 pounds of hamburger each year. Assuming that each hamburger is a quarter-pounder, how many hamburgers do Americans eat each year? Express your answer in scientific notation.

   1.2 billion pounds x 4 burgers per pound = 4.8 billion hamburgers eaten each year
   4.8 billion = 4.8 x 10^{9} hamburgers

5. Global Monster Bank makes 1/10 of a cent on each transaction it oversees. If the bank oversees 346,912 transactions in a day, how much money does it make?

   $0.001 x 346,912 = $346.91

STANDARD DEVIANTS SCHOOL
Basic Math

Working with Decimals
Check Your Knowledge

Module 6

Total Score
/ 50

A. Adding and Subtracting
Solve each problem. (3 points each)

1. 72.6 - 34.9 =

2. 12.21 + 21.12 =

3. 67.329 + 8.04 =

4. 1.0 - 0.0705 =

B. Multiplying and Dividing
Solve each problem. Show your work. (3 points each)

1. 5.62 x .08

2. $.08\overline{)4.76}$

3. 4.29 x 9.01

4. $0.23\overline{)8.05}$

C. Rounding
Round each number to the tenths place. (2 points each)

1. 5.82

2. 6.01

3. 0.947

4. 3.155

D. Scientific Notation
Convert each number to scientific notation. (3 points each)

1. 45,328,000,000

2. 0.657

3. 1,000,000,000,000,000

4. 0.00000000000009

E. Word Problems
Solve each problem. Show your work. (3 points each)

1. The stitching on a shirt sleeve hem is very close together: a stitch every 0.05 inches. If the hemline is 5.4 inches long, how many stitches are there?

2. The spiny horn frog hops at a speed of .35 miles an hour. How far can the frog hop in 2 1/2 hours?

Standard Deviants School — Basic Math

Working with Decimals
Check Your Knowledge
Answer Key

Module 6

Total Score / 50

A. Adding and Subtracting
Solve each problem. (3 points each)

1. 72.6 - 34.9 = **37.7**
2. 12.21 + 21.12 = **33.33**
3. 67.329 + 8.04 = **75.369**
4. 1.0 - 0.0705 = **0.9295**

B. Multiplying and Dividing
Solve each problem. Show your work. (3 points each)

1. 5.62 x .08 = **.4496**

   4496
   0
   .4496

2. .08 ⟌ 4.76 = **59.5**

   40
   76
   72
   40

3. 4.29 x 9.01 = **38.6529**

   429
   386100

4. 0.23 ⟌ 8.05 = **35**

   69
   115

C. Rounding
Round each number to the tenths place. (2 points each)

1. 5.82 **5.8**
2. 6.01 **6.0**
3. 0.947 **0.9**
4. 3.155 **3.2**

D. Scientific Notation
Convert each number to scientific notation. (3 points each)

1. 45,328,000,000 **4.5328×10^{10}**
2. 0.657 **6.57×10^{-1}**
3. 1,000,000,000,000,000 **1.0×10^{15}**
4. 0.00000000000009 **9×10^{-14}**

E. Word Problems
Solve each problem. Show your work. (3 points each)

1. The stitching on a shirt sleeve hem is very close together: a stitch every 0.05 inches. If the hemline is 5.4 inches long, how many stitches are there?
   5.4 ÷ 0.05 = 108 stitches

2. The spiny horn frog hops at a speed of .35 miles an hour. How far can the frog hop in 2 1/2 hours?
   0.35 x 2.5 = .875 miles

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