

Comparing Decimals



Grade Level: 4-6

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Classroom Procedure:

1. Display random whole numbers and decimals up to the 1000ths place for students to review. Ask: What is the same and different about the numbers?
2. Allow for responses and discussion. The students may try to overthink the question. The most important response will be related to the fact that some numbers are smaller or larger than others, and they can be placed in order. It doesn't matter if there is a decimal place or not, all numbers can be compared and ordered.
3. Review the place values for decimals. Ask student volunteers to name place values for digits in the displayed numbers.
4. Distribute *Comparing Decimals* content pages. Read and review the information with the students. Save the final question for the lesson closing. Use the additional resources to enhance understanding.
5. Distribute Activity pages to every student. Read and review the instructions. Pair students. Distribute scissors. The students will play until the teacher calls time, or if one student wins all of the cards. Allow sufficient time to play the game.
6. Circulate through the room to settle disputes and check for understanding.
7. Distribute Practice page. Check and review the students' responses.
8. Distribute the Homework page. The next day, check and review the students' responses. Allow volunteers to share the decimals they found at home or in other locations.
9. In closing, ask: *What are some reasons or examples for ordering and comparing decimals?*
10. Allow for responses and discussion.

Approximate Grade Level: 4 – 6

Objectives:

The students will be able to compare and order decimals through the thousandths place.

Common Core State Standards:

CCSS.Math.Content.4.NF.C.7

CCSS.Math.Content.5.NBT.A.3.B

No standard for Grade 6

Class Sessions (45 minutes):

1 – 2 class sessions.

Teaching Materials/Worksheets:

Comparing Decimals content pages (2), Activity pages (2), Practice page, Homework page

Student Supplies:

Scissors, handouts

Prepare Ahead of Time:

Random numbers/decimals for lesson opening. Pair students. Need scissors. Copy handouts.

Options for Lesson:

Create additional decimal cards for the activity. Plan a tournament for the activity until there are two players left. Use the cards for students to place the decimals in order from least to greatest or vice-versa. Time the students when ordering the activity decimals, winner does it the fastest and all must be in correct order.



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Teacher Notes

The lesson introduces students to comparing and ordering decimals. They should have an understanding of decimal place values prior to beginning the lesson. It can also be used in conjunction with a lesson introducing decimal place value. If students understand the basics of comparing whole numbers, the lesson may be less difficult for them. The more practice they receive, the better they will understand the lesson.



Additional Resources:

Content:

<http://www.mathgoodies.com/lessons/decimals/compare.html>

<http://www.cpalms.org/Public/PreviewResourceLesson/Preview/49356>

http://www.mathsisfun.com/ordering_decimals.html

<http://www.basic-mathematics.com/comparing-decimals.html>

<http://www.sheppardsoftware.com/mathgames/decimals/CompareDecimals.htm> (Interactive)

Worksheets:

<http://www.commoncoresheets.com/Decimals.php>

<http://www.mathworksheets4kids.com/greater-less-than.php>

http://www.math-aids.com/Greater_Than_Less_Than/Decimals.html

<http://www.greatschools.org/gk/worksheets/comparing-and-ordering-decimals/>

<http://www.math-drills.com/decimal.php>

Videos:

<https://www.youtube.com/watch?v=68TBZRfaKnA> (2 min-song)

https://learnzillion.com/lesson_plans/8587-compare-decimals-using-a-number-line (3 min)

<https://www.youtube.com/watch?v=HbItl3H0NEI> (3 min)

<https://www.youtube.com/watch?v=hrZL8HpWYFw> (10 min)

<https://www.youtube.com/watch?v=EX9CdUAMpgE> (3 min)

<https://www.youtube.com/watch?v=0JB3bNfLqEM> (3 min-reviews places)

https://www.youtube.com/watch?v=R1y7m_ornS8 (8 min)



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Decimal Place Value Review

As you already know, whole numbers are written starting with the one's place, then tens, hundreds, thousands, ten-thousands, etc. Decimals, of course, are also identified and read using their place values. Decimals are parts of whole numbers. One-tenth is the same as a dime, ten out of 100, or can be written as $\frac{1}{10}$. You must be able to identify the place values beginning to the right of the decimal point:

Whole				Parts		
3	5	7	.	2	4	6
Hundreds Place	Tens Place	Ones Place	Decimal	Tenths Place	Hundredths Place	Thousandths Place

The number to the left is read as *three-hundred fifty-seven and two-hundred forty-six thousandths*.

Every number, whole number or decimal, can be compared to other numbers, placed in order from least to greatest, or placed in order from greatest to least.

Most likely you had no problems placing whole numbers in order or comparing them to other whole numbers. Decimals, though, can sometimes be a little tricky, especially when you encounter additional decimal places past the hundredths place and into the thousandths or ten-thousandths places.

Comparing Decimals

The most popular decimal numbers involve money, and are easy to compare and place in order. This is because they are numbers that always have two decimal places representing cents. For example, here are some money figures compared to each other, and then placed in order from least to greatest:

$$\$23.45 < \$32.45$$

$$\$1.89 > \$1.78$$

$$\$11.09 < \$12.99$$

$$\$5.56 > \$5.49$$

$$\$1.78 - \$1.89 - \$5.49 - \$5.56 - \$11.09 - \$12.99 - \$23.45 - \$32.45$$

Money is often to place in order for two reasons: You see it often and compare prices of the things you buy, and second, notice there are always two decimals after the dollar amount. The decimals that may be a little tricky to compare and place in order usually do not have the same number of decimal places. How would you compare these decimals?

1.004

1.04

0.99

0.091

0.3

100.9

1.00001

3.0505

0.505

1.2204

0.03

10.0009

Notice, there are a different number of whole number and decimal place values. Some only have tenths, while others have hundredths, thousandths, and others. Comparing decimals may take a couple steps.



When you need to compare any number, whole or decimal, always begin at the decimal place. Here are examples along with the steps to follow when you compare two decimals:

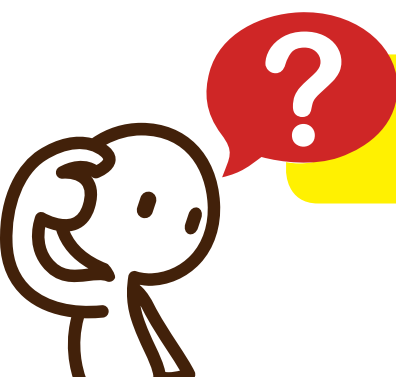
STEP 1	First, compare the whole numbers as usual. Regardless of the decimals, it is obvious that 2 is greater than 1. The decimal digits do not matter.	2.0001 > 1.9909 2.0001 is greater than 1.9909. You're done.
STEP 2	If the whole numbers are equal, review starting with the decimals. Begin with the tenths, 0 and 2. Two is larger, so 1.2001 is greater.	1.0001 < 1.2001 Since 2 tenths is larger than 0 tenths, 1.2001 is greater than 1.0001.
STEP 3	If the whole numbers are equal and the tenths are equal, move to the hundredths. Continue moving through the decimal places until you find one that is not a match to compare. Begin with the tenths, 0 and 0 are equal. Look at the hundredths - 1 and 0. One is larger, so 2.01 is greater.	2.01 and 2.0091 Now compare using Step 2: 2.01 > 2.0091

The same steps are used whether comparing one, two or more decimals; and when ordering decimals from least to greatest or greatest to least. At times, it may seem like the steps take you too long, but with practice you will be able to compare the decimals very quickly. More examples:

Step 1:	2.304 and 3.45 Compare whole numbers.	2.304 < 3.45
Step 2:	33.0108 and 33.1008 Compare decimals only	33.0108 < 33.1008
Step 3:	0.07 and 0.0099 Continue until no match	0.0085 > 0.0099

Finally, inserting zeros at the end of a decimal will not change the value of the decimal. For example, 5.001 is equal to 5.0010000. However, 5.001 does not equal 5.0001. You can only use zeros as placeholders following the last decimal place value, and cannot use them in the middle.

As always, the more you practice comparing and ordering decimals, the easier it will be for you.



What are some reasons or examples for ordering and comparing decimals?





Activity

Name _____ Date _____

Cut apart each of the decimals. Shuffle your set and you will play “War” with a partner. Flip a card and the greatest decimal wins both cards. Game ends when teacher calls time.

1.000101	1.010111	1.2011	0.0123
2.34	1.01002	2.0105	0.0301
1.1	1.001	1.3001	2.3056
1.01901	2.056	1.30101	1.0303
2.6050	1.012	2.013	3.013





Activity

Name _____ Date _____

1.00301	2.012	1.809	3.0091
1.11101	2.0908	2.9	2.0087
2.1008	2.010101	2.003	0.00008
0.00708	1.01	2.01	3.01
3.008	2.7	2.0008	1.097





Practice

Name _____ Date _____

Compare each using $<$, $>$, or $=$

0.01	<input type="text"/>	0.001	10.5060	<input type="text"/>	10.506	3.009	<input type="text"/>	3.0001
2.7	<input type="text"/>	1.7	1.009	<input type="text"/>	1.0009	0.00005	<input type="text"/>	5
50.005	<input type="text"/>	49.005	5.01	<input type="text"/>	6.0001	100.001	<input type="text"/>	99.9999
9.0106	<input type="text"/>	9.1006	21.60	<input type="text"/>	21.06	8.32	<input type="text"/>	3.28
5.06	<input type="text"/>	5.060	11.111	<input type="text"/>	11.12	50.0505	<input type="text"/>	50.5
0.606	<input type="text"/>	0.66	1.012	<input type="text"/>	1.102	1.19	<input type="text"/>	11.9
0.0007	<input type="text"/>	0.007	13.025	<input type="text"/>	13.025	0.01	<input type="text"/>	0.011
23.12	<input type="text"/>	21.12	1.0012	<input type="text"/>	1.1002	66.6	<input type="text"/>	67.666

Order each set of numbers from least to greatest

SET 1	SET 2	SET 3
0.023	1.001	17.007
1.005	0.05	16.1
1.02	21.0006	0.00087
21.03	2.01	1.0101
0.3033	0.0009	106.001
0.01	0.9009	1.61
0.00001	9.0909	1.70001
55.999	10.001	0.00708





Homework

Name _____ Date _____

Match

- | | | | | |
|----|-------|---|---|----------|
| 1 | _____ | Number that is equivalent to 1.0001 | A | < |
| 2 | _____ | Compare the numbers: 0.04401 _____ 0.04599 | B | Step 3 |
| 3 | _____ | Use as a placeholder for decimals | C | Step 2 |
| 4 | _____ | 0.0203 is _____ than 0.0302 | D | Greater |
| 5 | _____ | A number that is 0.001 more than 0.003 | E | 5.01500 |
| 6 | _____ | What step is: Compare whole numbers as usual? | F | 1.00010 |
| 7 | _____ | What number is larger than 1.055, but smaller than 1.55? | G | = |
| 8 | _____ | 1.00101 is _____ than 0.0009999 | H | 0 |
| 9 | _____ | Number equivalent to 10.001 | I | Less |
| 10 | _____ | What step is: If whole numbers are equal, compare decimals? | J | 0.0002 |
| 11 | _____ | Compare the numbers: 1.00999 _____ 1.0707 | K | Step 1 |
| 12 | _____ | What number is equal to 5.015? | L | > |
| 13 | _____ | A number that is 0.0001 less than 0.0003 | M | 1.505 |
| 14 | _____ | What step includes inserting place holders? | N | 0.004 |
| 15 | _____ | Compare the numbers: 0.09 _____ 0.09000 | O | 10.00100 |

Find 8 places a decimal is written and list them from greatest to least. Use food packages, books, magazines, the Internet; anywhere. Include the meaning of the decimal.

1.		5.	
2.		6.	
3		7.	
4.		8.	





Activity

Name Answer Key (may vary) Date _____

Cut apart each of the decimals. Shuffle your set and you will play “War” with a partner. Flip a card and the greatest decimal wins both cards. Game ends when teacher calls time.

Below are the activity decimals ordered from smallest to largest if used for an optional assignment.

0.00008	2.0008
0.00708	2.003
0.0123	2.0087
0.0301	2.01
1.000101	2.010101
1.001	2.0105
1.00301	2.012
1.01	2.013
1.01002	2.056
1.010111	2.0908
1.012	2.1008
1.01901	2.3056
1.0303	2.34
1.097	2.605
1.1	2.7
1.11101	2.9
1.2011	3.008
1.3001	3.0091
1.30101	3.01
1.809	3.013





Practice

Name Answer Key Date _____

Compare each using $<$, $>$, or $=$

0.01	$<$	0.001	10.5060	$=$	10.506	3.009	$>$	3.0001
2.7	$>$	1.7	1.009	$>$	1.0009	0.00005	$<$	5
50.005	$>$	49.005	5.01	$>$	6.0001	100.001	$>$	99.9999
9.0106	$<$	9.1006	21.60	$>$	21.06	8.32	$>$	3.28
5.06	$=$	5.060	11.111	$<$	11.12	50.0505	$<$	50.5
0.606	$<$	0.66	1.012	$<$	1.102	1.19	$>$	11.9
0.0007	$<$	0.007	13.025	$=$	13.025	0.01	$<$	0.011
23.12	$>$	21.12	1.0012	$<$	1.1002	66.6	$>$	67.666

Order each set of numbers from least to greatest

SET 1		SET 2		SET 3	
0.023	0.00001	1.001	0.0009	17.007	0.00087
1.005	0.01	0.05	0.05	16.1	0.00708
1.02	0.023	21.0006	0.9009	0.00087	1.0101
21.03	0.3033	2.01	1.001	1.0101	1.61
0.3033	1.005	0.0009	2.01	106.001	1.70001
0.01	1.02	0.9009	9.0909	1.61	16.1
0.00001	21.03	9.0909	10.001	1.70001	17.007
55.999	55.999	10.001	21.0006	0.00708	106.001





Homework

Name Answer Key

Date _____

Match

- | | | | | |
|----|----------|---|---|----------|
| 1 | <u>F</u> | Number that is equivalent to 1.0001 | A | < |
| 2 | <u>A</u> | Compare the numbers: 0.04401 _____ 0.04599 | B | Step 3 |
| 3 | <u>H</u> | Use as a placeholder for decimals | C | Step 2 |
| 4 | <u>I</u> | 0.0203 is _____ than 0.0302 | D | Greater |
| 5 | <u>N</u> | A number that is 0.001 more than 0.003 | E | 5.01500 |
| 6 | <u>K</u> | What step is: Compare whole numbers as usual? | F | 1.00010 |
| 7 | <u>M</u> | What number is larger than 1.055, but smaller than 1.55? | G | = |
| 8 | <u>D</u> | 1.00101 is _____ than 0.0009999 | H | 0 |
| 9 | <u>O</u> | Number equivalent to 10.001 | I | Less |
| 10 | <u>C</u> | What step is: If whole numbers are equal, compare decimals? | J | 0.0002 |
| 11 | <u>L</u> | Compare the numbers: 1.00999 _____ 1.0707 | K | Step 1 |
| 12 | <u>E</u> | What number is equal to 5.015? | L | > |
| 13 | <u>J</u> | A number that is 0.0001 less than 0.0003 | M | 1.505 |
| 14 | <u>B</u> | What step includes inserting place holders? | N | 0.004 |
| 15 | <u>G</u> | Compare the numbers: 0.09 _____ 0.09000 | O | 10.00100 |

Find 8 places a decimal is written and list them from greatest to least. Use food packages, books, magazines, the Internet; anywhere. Include the meaning of the decimal.

1.		5.	
2.		6.	
3		7.	
4.		8.	

