Session 2 ~ Decimals, Fractions, and Percents

Participant Packet

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<table>
<thead>
<tr>
<th>Grade 5: Decimals, Fractions and Percents</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.ME.05.08</td>
</tr>
<tr>
<td>Understand the relative magnitude of ones, tenth, and hundredths and the relationship of each place value to the place to its right, e.g., 1 is 10 tenths, one tenth is 10 hundredths.</td>
</tr>
<tr>
<td>N.ME.05.09</td>
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<tr>
<td>Understand percentages as parts out of 100, use % notation, and express a part of a whole as a percentage</td>
</tr>
<tr>
<td>N.MR.05.22</td>
</tr>
<tr>
<td>Express fractions and decimals as percentages and vice versa</td>
</tr>
<tr>
<td>N.ME.05.23</td>
</tr>
<tr>
<td>Express ratios in several ways given applied situations, e.g., 3 cups to 5 people, 3:5, 3/5; recognize and find equivalent ratios.</td>
</tr>
</tbody>
</table>

### Instructional Sequence:

1. **Understand how the fractional part is related to the whole**
2. **Express ratios and find equivalent ratios**
3. **Divide one whole into ten parts and recognize that one whole is ten tenths**
4. **Express as a decimal**
5. **Recognize that one tenth is 10 hundredths**
6. **Express as a decimal**
7. **Understand percentages as parts out of 100**
8. **Express percentages as fractions and decimals**
9. **Divide one whole into one hundred parts and recognize that one whole is 100 hundredths**
10. **Express as a decimal**
Important Tips:

- The numerator of a fraction tells how many parts are being considered
- The denominator of a fraction indicates the kind or size parts the numerator counts
- Give students time to reflect on past knowledge
- Give students opportunities to share their thoughts in small groups
- Relate decimals and percents to everyday events (sports, money, etc.)
- Keep reinforcing the relationship between decimals and fractions
- Learning procedures without a firm foundation of understanding limits students ability to problem solve
- Build on students knowledge of place value in the whole number system
- Continue to ask for multiple representations of decimal numbers including fractions

Common Misconceptions:

- Students are unable to explain their reasoning
- Students think .2 and .20 are different numbers
- Students think .36 is larger than .4
- Students think hundreds and hundredths are the same measure
- Students do not think that 20% of the whole is the same as \( \frac{1}{5} \) of the whole
Looking at the part to find the whole

Given this piece, draw and highlight the whole.

1. \[ \frac{1}{2} \]
2. \[ \frac{1}{3} \]
3. \[ \frac{1}{4} \]
4. \[ \frac{2}{5} \]
5. \[ \frac{2}{3} \]
6. \[ \frac{3}{4} \]
7. \[ \frac{4}{5} \]
8. \[ 1 \frac{1}{3} \]
9. \[ 1 \frac{3}{4} \]
10. \[ \frac{7}{10} \]
Find the percent of the drawing that is shaded.
Comparing our fraction strips to our tenths ruler

If we think of the ruler as one whole, label what each heavy black line would represent on our ruler.

What does each of the small divisions represent?

How many small divisions make up one section between two heavy black marks?

Take your fourths fraction strip and line it up with the tenths strip. Where are

\[
\begin{align*}
\frac{1}{4} & \quad \frac{1}{4} \\
\frac{2}{4} & \quad \frac{1}{4} \\
\frac{3}{4} & \quad \frac{1}{4} \\
\frac{4}{4} & \quad \frac{1}{4} \\
\frac{4}{4} & \quad \frac{1}{4}
\end{align*}
\]

If we think of this big square as one whole, what do the strips represent?

Can we represent \( \frac{1}{4} \) on this square? How?
If we think of this big square as one whole, what does each smaller square represent?

Can we represent \( \frac{1}{4} \) on this model? How?

Can we represent \( \frac{1}{8} \) on this model? How?
Using your hundredths grids, shade the following

1. fifty-two-hundredths

   A. How many hundredths do we have?
   B. How many tenths do we have?
   C. Do we have any extra hundredths when we count out the tenths? If so, how many?
   D. Write the decimal name.

2. three-tenths

   A. How many hundredths do we have?
   B. How many tenths do we have?
   C. Do we have any extra hundredths when we count out the tenths? If so, how many?
   D. Write the decimal name.
3. eight-hundredths

A. How many hundredths do we have?
B. How many tenths do we have?
C. Do we have any extra hundredths when we count out the tenths? If so, how many?
D. Write the decimal name.

4. eighty-hundredths

A. How many hundredths do we have?
B. How many tenths do we have?
C. Do we have any extra hundredths when we count out the tenths? If so, how many?
D. Write the decimal name.
5. one and twenty-four-hundredths

A. How many hundredths do we have?  
B. How many tenths do we have?  
C. Do we have any extra hundredths when we count out the tenths? If so, how many?  
D. Do we have any wholes?  
E. Write the decimal name
Who Has the Bigger Number?
Adapted from “Lessons for Decimals and Percents” by Carrie DeFrancisco and Marilyn Burns

Each player has three rolls. They can decide in which column they would like to place their digit. Each player must verbalize the number they made. They then compare the two answers to determine the winner.

Who has the Largest Number?

<table>
<thead>
<tr>
<th>Your Number</th>
<th>Opponents Number</th>
<th>Won</th>
<th>Lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.____ _____ reject _____</td>
<td>1. _______</td>
<td>1. _____ _____</td>
<td></td>
</tr>
<tr>
<td>2. 0.____ _____ reject _____</td>
<td>2. _______</td>
<td>2. _____ _____</td>
<td></td>
</tr>
<tr>
<td>3. 0.____ _____ reject _____</td>
<td>3. _______</td>
<td>3. _____ _____</td>
<td></td>
</tr>
<tr>
<td>4. 0.____ _____ reject _____</td>
<td>4. _______</td>
<td>4. _____ _____</td>
<td></td>
</tr>
<tr>
<td>5. 0.____ _____ reject _____</td>
<td>5. _______</td>
<td>5. _____ _____</td>
<td></td>
</tr>
<tr>
<td>6. 0.____ _____ reject _____</td>
<td>6. _______</td>
<td>6. _____ _____</td>
<td></td>
</tr>
<tr>
<td>7. 0.____ _____ reject _____</td>
<td>7. _______</td>
<td>6. _____ _____</td>
<td></td>
</tr>
<tr>
<td>8. 0.____ _____ reject _____</td>
<td>8. _______</td>
<td>8. _____ _____</td>
<td></td>
</tr>
<tr>
<td>9. 0.____ _____ reject _____</td>
<td>9. _______</td>
<td>9. _____ _____</td>
<td></td>
</tr>
<tr>
<td>10. 0.____ _____ reject _____</td>
<td>10. _______</td>
<td>10. _____ _____</td>
<td></td>
</tr>
</tbody>
</table>

Total Wins _______
Who has the Smallest Number?

<table>
<thead>
<tr>
<th>Your Number</th>
<th>Opponents Number</th>
<th>Won</th>
<th>Lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>reject</td>
<td>reject</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0._____</td>
<td>_______</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. _______</td>
<td>_______</td>
<td></td>
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<tr>
<td>2. _______</td>
<td>_______</td>
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<tr>
<td>3. _______</td>
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<td>4. _______</td>
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<td>5. _______</td>
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<td>6. _______</td>
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<td>8. _______</td>
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<td>9. _______</td>
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<tr>
<td>10. _______</td>
<td>_______</td>
<td></td>
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</tbody>
</table>

Total Wins _______
Solve the following riddles by explaining your reasoning

1. I have 6 ones, 13 tenths and 5 hundredths. What is the number?

2. I have 40 hundredths and 4 tenths. What is the number?

3. The number is 75 hundredths. I have 35 hundredths. How much more do I need?

4. I have 17 tenths, 3 ones, and 23 hundredths. What is the number?

5. If you add 4 more tenths, the total would be worth 1 whole and 3 tenths. What is the number?

6. I have 18 hundredths. I added some tenths and now I have more than 7 tenths and less than 8 tenths. What is the number?

Write your own riddles.

7.

8.
Using Tangrams

What fraction of the whole is each part? What percent of the whole is each part?
Visiting the Zoo

Penguin Exhibit

| X |   |
|   | X |
| X |   |
|   | X |

Polar Bear Exhibit

| X |   |
|   | X |
| X |   |
|   | X |

1. Pictured above is the seating at two exhibits at the zoo. Which exhibit appears to be the most popular? Why?

2. Fill in the following ratio table to show larger and smaller exhibits with the same attendance ratio as the penguin exhibit.

<table>
<thead>
<tr>
<th>Exhibit</th>
<th>Penguin</th>
<th>Exhibit 2</th>
<th>Exhibit 3</th>
<th>Exhibit 4</th>
<th>Exhibit 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seats Filled</td>
<td>40</td>
<td>4</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Seats</td>
<td>100</td>
<td>40</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A. What fraction of the seats in the penguin exhibit is filled?

B. What percent of the seats in the penguin exhibit is filled?

C. Shade the bar to show the attendance at the penguin exhibit.

0

20 SEATS

0%

100%
3. Fill in the following ratio table to show larger and smaller exhibits with the same attendance ratio as the polar bear exhibit

<table>
<thead>
<tr>
<th>Exhibit</th>
<th>Polar Bear</th>
<th>Exhibit 7</th>
<th>Exhibit 8</th>
<th>Exhibit 9</th>
<th>Exhibit 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seats Filled</td>
<td>24</td>
<td>120</td>
<td>20</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Total Seats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A. What fraction of the seats in the polar bear exhibit is filled?

B. What percent of the seats in the polar bear exhibit is filled?

C. Shade the bar to show the attendance at the polar bear exhibit.

0 % 40 SEATS

0% 100%

4. Compare the attendance at the two exhibits.