Module 1: Use of Manipulatives and Strategies Part 2

Focus on Decimals
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Focus on Decimals
Addition/Subtraction

Focus strategies:
- base-ten materials
- empty number line
- place value

Base-ten materials:

Empty Number line:

Place Value:
Subtraction

Base-ten materials:
- whole
- tenth
- hundredth
1.54 + 0.33
1.54 + 0.33
1.54 + 0.33

1 whole
8 tenths
7 hundredths
1.54 + 0.33 = 1.87

*Think about: How you could use this same strategy to solve 1.54 - 0.33.
Place Value:

\[
1.54 + 0.33 = 1.87
\]

\[
\begin{array}{c|c|c}
\hline
\text{ones} & \text{tenths} & \text{hundredths} \\
\hline
1 & 5 & 4 \\
+ & 3 & 3 \\
\hline
1 & 8 & 7 \\
\hline
\end{array}
\]
Don't be afraid to encourage students to use a place value chart.
\[ \text{tens} \quad \text{ones} \quad \text{tenths} \quad \text{hundredths} \]

\[ 1.54 + 0.33 \]

\[ \frac{1}{10} \quad \frac{54}{100} \quad \frac{33}{100} \]

\[ \frac{1}{10} + \frac{3}{10} = \frac{4}{10} \]

\[ 1.87 \]
<table>
<thead>
<tr>
<th>tens</th>
<th>ones</th>
<th>tenths</th>
<th>hundredths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>54</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>+</td>
<td>33</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.87</td>
</tr>
</tbody>
</table>
Empty Number line:
$1.54 + 0.33$

$+D_{0.03} +.3$

1.54 1.57 1.87
Multiplication

Focus strategies:
- Base-ten materials
- Base-ten Fraction
- Partial Products

Partial Products:

Base-ten Materials:

Base-ten Fractions:
Base-ten Materials:
*Think about: What is the length of this rectangle? What is the width of this rectangle? How do you know?
Base-ten Fractions:
$1.4 \times 0.4$

$rac{4}{10} \times \frac{4}{10}$
$1.4 \times 0.4$

$\frac{14}{10} \times \frac{4}{10}$
\[ 1.4 \times 0.4 = \frac{14}{10} \times \frac{4}{10} = \frac{56}{100} \]
$1.4 \times 0.4$

\[
\frac{14}{10} \times \frac{4}{10} = \frac{56}{100}
\]

\[
\frac{56}{100} = 0.56
\]

*Think about: Can this strategy be used with numbers containing 3 or 4 decimal places?
$1.4 \times 0.4$

**wholes:** $1 \times 0$

**wholes/tenths:** $1 \times 0.4$

**tenths:** $0 \times 0.4$

$0.4 \times 0.4$
$1.4 \times 0.4$

wholes

$1 \times 0 = 0$

wholes/tenths

$1 \times .4 = .4$

tenths

$.4 \times .4 = .16$
$1.4 \times 0.4 = 0.56$

wholes: $1 \times 0 = 0$

wholes/tenths: $1 \times 0.4 = 0.4$

tenths: $0 \times 0.4 = 0$

$0.4 \times 0.4 = 0.16$
Division

Base-ten Materials:

Focus strategies:
- Base-ten Materials
- Base-ten Fractions
- Standard Algorithm

Base-ten Fractions:

Standard Algorithm:
Revision

Base-ten Materials:
2.31 \div 2.1
2.31 ÷ 2.1
*Think about: How does this strategy relate to using base ten blocks for multiplication?
3.6 ÷ 1.2

1.2

×

3.6
$3.6 \div 1.2$

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<tbody>
<tr>
<td>1</td>
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<tr>
<td>1</td>
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</table>
$$3.6 \div 1.2 = 3$$

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<th>1.2</th>
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<td>1</td>
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$$\times$$

$$x = 3$$

*Think about: Why is it important to have more information?*
Base-ten Fractions:

1.36 ÷ 0.2
1 36/100 ÷ 2/10
1 36/100 ÷ 9/10
1 36/100 ÷ 90/100

20/36.0
-120/160
-160/160

6.8
20/36.0
-120/160
-160/160
1.36 ÷ 0.2

\frac{36}{100} ÷ \frac{2}{10}
$1.36 \div 0.2$

$\frac{36}{100} \div \frac{2}{10}$

$\frac{36}{100} \div \frac{20}{100}$
1.36 ÷ 0.2

1 \frac{36}{100} ÷ \frac{2}{10}

1 \frac{36}{100} ÷ \frac{20}{100}

\frac{136}{100} ÷ \frac{20}{100}
$1.36 \div 0.2$

\[
\begin{array}{c|c|c}
& \frac{6.8}{0} & \\
\hline
20 & 136.0 & \\
\hline
& -120 & \\
\hline
& 160 & \\
\hline
& -160 & \\
\hline
\end{array}
\]
1.36 ÷ 0.2 = 6.8

\[
\begin{array}{r}
20 & | & 36.0 \\
\hline
120 & & \\
\hline
160 & & \\
\hline
0 & & \\
\end{array}
\]
Standard Algorithm:

\[ 4.83 \div 2.6 = 1.83 \]

\[ 48.3 \div 26 = 1.858 \]
4.83 ÷ 2.6
48.3 ÷ 26
26\sqrt{48.3}
Meeting Students' Needs

Differentiation

Tiered Tasks

Small Group Instruction

https://jenisesexton.wordpress.com/?s=small+group
C–R–A at their own pace

concrete–representational–abstract

Allow students their own time to build their understanding. They will be in different places of understanding which is normal. It is okay for students to remain in the representational stage for an extended period until they are ready to move to abstract thinking.
Meeting Students' Needs

Differentiation  Tiered Tasks

Small Group Instruction

https://jenisesexton.wordpress.com/?s=small+group
Below, At, and Above
Tier 1:
Consider the number sentence $1460 \div 7 = 20857$, is it true? If not use what you know about estimation to determine the correct placement of the decimal point. Justify your solution.

The task is to use only this information and estimation to give a fairly precise answer to each of the following expressions. Be sure to justify each of your solutions.

Tier 2:
Consider the number sentence $146 \div 7 = 20857$, is it true? If not use what you know about estimation to determine the correct placement of the decimal point. Justify your solution.

The task is to use only this information and estimation to give a fairly precise answer to each of the following expressions. Be sure to justify each of your solutions.

Tier 3:
Consider the number sentence $146 \div 7 = 20857$, is it true? Use base ten blocks or visual representations to justify your solution.

The task is to use only this information and estimation to give a fairly precise answer to each of the following expressions. Be sure to justify each of your solutions.
Meeting Students' Needs

Differentiation  Tiered Tasks

Small Group Instruction  https://jenisesexton.wordpress.com/?s=small+group
45 minutes classes
Option 1 - 45 minutes

30 students, 4 groups

- Monday- whole group lesson, mini-lesson, student-centered work session
- Tuesday- small group rotations
- Wednesday- small group rotations
- Thursday- Formative assessment, whole group lesson
- Friday- Common formative assessment
60 minutes classes
Option 2 - 60 minutes

30+ students, 4 groups

- Monday - whole group, mini-lesson, student-centered, independent practice
- Tuesday - small group rotation
- Wednesday - small group rotation
- Thursday - Formative assessment, whole group lesson
- Friday - Common formative assessment
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