Problem Solving Tasks and Games that Develop Meaning by Connecting Multiple Strategies

Grades K-2

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Nan and Bert Problems

Show or tell how to solve each problem. Write a number sentence. Use cubes, a number line, or ten frames. You may also draw a picture.

1. Nan and Bert went on a picnic at the lake. Nan ate 9 grapes and Bert ate 5. How many did they eat altogether?

Number sentence _____________________________________________________________________

- Ten Frame 1
- Ten Frame 2

- Number Line: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
2. Grandma packed 15 baby carrots. Nan and Bert ate them all. If Nan ate 7, how many did Bert eat?

Number sentence ________________________________

3. Grandma’s ticket to the zoo cost $6. Nan and Bert’s each cost $4. How much did all 3 tickets cost?

Number sentence ________________________________
4. At the gift shop, Bert spent $16 and Nan spent half that much. How much did Nan spend?

Number sentence ________________________________

5. Nan and Bert each brought a package of 8 crackers for a snack. How many crackers do they have altogether?

Number sentence ________________________________
Materials:
• 1 0-5 die
• 10 unifix cubes in two colors, one tower per student

Students take turns rolling a die and building a tower with that quantity. The other student then adds blocks to the tower to make ten.

Figure 1: A sample round of Towers of Ten
Doubles, Doubles +1, Doubles –1

The object of this game is to write number sentences to show doubles, doubles +1, or doubles –1 and to predict whether the sum will be odd or even. This is a game for two players.

Materials:
- Number Spinner (1–10) and Doubles Spinner
- Clear plastic spinner or a pencil and paper clip
- 25 connecting cubes
- Doubles, Doubles +1, Doubles –1 Recording Sheet

Directions:
1. Player 1 spins the Number Spinner and the Doubles Spinner. For example, Player 1 spins a 7 and Doubles –1.
   - Use the spins to write a number sentence and predict whether the sum is odd or even. Find the sum and circle whether the sum is even or odd. Record your work on the recording sheet.

2. Player 2 checks Player 1’s work and places a ✔ in Player 1’s last column if the prediction is correct.
3. Player 2 now spins, makes a prediction, and completes the next row on the recording sheet.
4. Players continue to take turns for five rounds.
5. The player with most correct predictions wins.
Doubles, Doubles +1, Doubles −1, Spinners

Number Spinner

Doubles Spinner

Doubles
Doubles −1
Doubles +1
Doubles, Doubles +1, Doubles –1 Recording Sheet

<table>
<thead>
<tr>
<th>Number Sentence</th>
<th>Sum</th>
<th>Even or Odd</th>
<th>Prediction Correct</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

Discuss

Use your table to answer these questions with your partner.

1. What do you notice about the sums when both numbers are even?
2. What do you notice about the sums when both numbers are odd?
3. What do you notice about the sums when you add an even number and an odd number?
Not More Than 100 Game

This is a game for two or more players. The goal of this game is to get as close to 100 cubes as possible in exactly five spins without going over.

Materials

- Not More Than 100 Recording Sheets
- Not More Than 100 Spinner
- a clear plastic spinner or a pencil and paper clip
- 100 connecting cubes per player, grouped in ones and tens

Directions

1. Players take turns spinning the spinner. They each get 5 turns.
2. With each spin, a player takes that number of ones or tens from the pile of cubes.
3. The player records the number taken on his or her recording sheet. Example: You spin a 5. You can take 5 ones and record 5 ones or you can take 5 tens and record 5 tens.
4. After five spins, the player who has the most connecting cubes, but not more than 100, wins.
Sample Recording Sheet

<table>
<thead>
<tr>
<th>Spin</th>
<th>Tens</th>
<th>Ones</th>
<th>Number Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>0</td>
<td>50 + 0 = 50</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>0</td>
<td>50 + 6 = 56</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>0</td>
<td>56 + 20 = 76</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>9</td>
<td>76 + 9 = 85</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>0</td>
<td>85 + 10 = 95</td>
</tr>
</tbody>
</table>

Not More Than 100 Spinner
## Not More Than 100 Recording Sheets

<table>
<thead>
<tr>
<th>Spin</th>
<th>Tens</th>
<th>Ones</th>
<th>Number Sentence</th>
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</thead>
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<td>Tens</td>
<td>Ones</td>
<td>Number Sentence</td>
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</table>
\[ 8 + 6 \]

\[ 10 + 4 = 14 \]

\[ 6 + 6 + 2 = 14 \]

\[ 8 + 6 = 14 \]

\[ 16 - 2 = 14 \]
Tell me a story for this problem. Ask connection questions: What does + mean in your story? What does the [3] mean?

Show your story [on a number line, with a picture, by acting it out, by acting it out with objects].

Provide the problem in a context.

Show or tell me how you would solve the problem.

Try to solve it with [a number line, counters].

See how many different ways you can solve this problem.

Try to count a different way. counting up, counting back, counting on.

I see you solved [4 + 3]. Find a way to solve [14 + 3].

What friendly fact might help?

Try to solve it with a different friendly fact. How could [ten, a double] help?

Try to use [ten frames, a rekenrek].

I see you know [6 + 4]. How can that help you solve [8 + 4]?

What addition fact might help with this subtraction problem?
## My Addition Strategies Menu for Larger Numbers

<table>
<thead>
<tr>
<th>Counting All</th>
<th>Counting On</th>
<th>Another Strategy</th>
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<tbody>
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<table>
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<tr>
<th>Making Ten</th>
<th>Using Ten</th>
<th>Using Doubles</th>
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<tbody>
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</tbody>
</table>

- **Counting All**
- **Counting On**
- **Making Ten**
- **Using Ten**
- **Using Doubles**
- **Another Strategy**
Addition Strategies Menu for Larger Numbers

- **Making Ten**
  \[8 + 4 = 12\]

- **Using Ten**
  \[9 + 8 = 17\]

- **Using Doubles**
  \[6 + 7 = 13\]
  \[6 + 6 = 12\]

- **Counting All**
  \[10 + 2 = 12\]

- **Counting On**
  \[9 + 4 = 13\]

- **Another Strategy**
  \[9 + 8 is one more or 17.\]
Subtraction Strategies Menu

Counting Strategies

Counting Up

8 - 5 = 3

Counting Back

9 - 2 = 7

Another Strategy

Reasoning Strategies

Using Ten

9 - 5 = 4

Using Doubles

8 - 3 = 5

Making Ten

10 - 6 = 4

To solve 8 - 3, I take off one less so 8 - 3 = 5.

I know 6 + 4 = 10 so 10 - 6 = 4.
Addition Strategies Menu for the Facts

Counting All

10 + 2 = 12

Counting On

9 + 4 = 13

Another Strategy

Making Ten

8 + 4 = 12

Using Ten

9 + 8 = 17

Using Doubles

6 + 7 = 13

8 + 4

8 + 2 + 2

so

10 + 2 = 12

10 + 8 = 18

so

9 + 8 is one less or 17.

6 + 6 = 12

so

6 + 7 is one more or 13.
Subtraction Strategies Menu for the Facts

**Counting Up**

\[ 8 - 5 = 3 \]

\[ \begin{array}{cccccc}
  & & & & & \\
  & & & & & \\
  & & & & & \\
  & & & & & \\
 6 & 7 & 8 & & & \\
\end{array} \]

To solve \( 13 - 7 \), I start with one less.

**Using Ten**

\[ 12 - 9 = 3 \]

\[ \begin{array}{cccc}
  & & & \\
  & & & \\
  & & & \\
  & & & \\
 6 & 7 & 8 & \\
\end{array} \]

**Counting Back**

\[ 9 - 2 = 7 \]

\[ \begin{array}{cccc}
  & & & \\
  & & & \\
  & & & \\
 6 & 7 & & \\
\end{array} \]

To solve \( 13 - 7 \), I start with one less.

**Using Doubles**

\[ 7 + 7 = 14 \]

\[ \begin{array}{cccc}
  & & & \\
  & & & \\
  & & & \\
  & & & \\
 6 & 7 & 8 & \\
\end{array} \]

**Thinking Addition**

\[ 11 - 3 = 8 \]

I know \( 8 + 3 = 11 \) so \( 11 - 3 = 8 \).

**Making Ten**

\[ 10 - 6 = 4 \]

I know \( 6 + 4 = 10 \) so \( 10 - 6 = 4 \).
Addition Strategies Menu

**Finding Friendly Numbers**

138 + 29

140 + 30 = 170

170 is a reasonable estimate.

**Counting On**

138 + 29

138 + 30 - 1 = 167

**Using Base-Ten Pieces**

68 + 55 = 123

Trade 11 skinnies and 13 bits for 1 flat, 2 skinnies, and 3 bits

**Using Expanded Form**

68 = 60 + 8
+ 55 = 50 + 5
110 + 13 = 123

**Using All-Partials**

68 + 55
110
13
123

**Using the Compact Method**

1 68
+ 55
123

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