Addition and subtraction strategies II

Additive Strategies progression, 4th step

The purpose of this activity

In this activity, you will use number lines to encourage the learners to become familiar with a variety of addition and subtraction mental partitioning strategies for multi-digit problems, for example 26 + 27, 47 - 38.

The learners need to be familiar with the concepts addressed in the “Addition and subtraction strategies I” activity before starting this activity.

The teaching points

- There are a variety of different partitioning strategies (see Learning Progressions for Adult Numeracy for examples.)
- Different problems lend themselves to different strategies, and competent learners have a range of strategies to choose from.
- Number lines marked in tens and then empty number lines are useful materials for developing mental strategies.
- Discuss with learners the situations where they need to solve addition and subtraction problems and the advantages of being able to do this mentally.

Resources

- Number lines marked up in tens.
- Empty number lines.

continued...
The guided teaching and learning sequence

1. Ask the learners individually to use number lines marked with tens to solve $37 + 26$ in any way they can and then explain what they have done to the whole group.

2. Listen for different strategies and record them on the board on number lines marked with tens.
   
   For example:
   
   - $37 + 20 = 57$ and $6$ more make 63.
     
     \[ \begin{array}{c}
     0 & 10 & 20 & 30 & 40 & 50 & 60 & 70 & 80 & 90 & 100 \\
     \hline
     & & 27 & 37 & +20 & 57 & 63 \\
     \end{array} \]

   - $37 + 3 = 40$, and 23 more makes 63.
     
     \[ \begin{array}{c}
     0 & 10 & 20 & 30 & 40 & 50 & 60 & 70 & 80 & 90 & 100 \\
     \hline
     & & 27 & 37 & +3 & 50 & 63 \\
     \end{array} \]

   - $30 + 20$ makes 50 and $7 + 6 = 13$ and $50 + 13$ makes 63.
     
     \[ \begin{array}{c}
     0 & 10 & 20 & 30 & 40 & 50 & 60 & 70 & 80 & 90 & 100 \\
     \hline
     & & 7 & 13 & +20 & 63 \\
     \end{array} \]

3. Ask the learners to work in groups, using marked number lines to solve similar problems, for example, $26 + 27$, $14 + 39$ and $62 + 35$, and to demonstrate and share as many strategies as possible. Ask them to consider whether different strategies are easier for different problems.

4. Once the learners are demonstrating a variety of strategies for addition, repeat steps 1 to 3 above with subtraction.

   An example is $45 - 18$ and possible strategies include:

   - $45 - 5 = 40$, subtract 3 more makes 37 and another 10 makes 27.
45 - 20 = 25 and add 2 makes 27.

18 + 2 = 20 and another 25 makes 45: 27 is added in total.

5. When the learners are familiar with using number lines marked in tens, repeat the above steps with empty number lines.

   • For example, 37 + 26.

6. When the learners are familiar with using unmarked number lines, challenge them to solve problems mentally, giving answers and describing the strategies they used. Encourage any learners who are having difficulty to use an empty number line.

**Follow-up activity**

Give the learners cards with one addition or subtraction problem on each card. Working one on one or with the learners in pairs or in groups, ask the learners to solve the problem and explain the strategy they used.