The National Assessment Program Year 3 Numeracy tests have many addition and subtraction questions. Student performance on these questions varies greatly but is usually dependent on the demand of the question. For example, the difference between a simple recall of a number fact compared to a question presented as a word problem with multiple calculations. A question involving simple subtraction with a diagram to assist was answered correctly by 83% of Year 3 students. Compare this to a written problem involving a combination of calculations, which was answered correctly by only 15% of Year 3 students.

The following set of questions provides a range of addition and subtraction problems which could be used with other school-based assessment as a diagnostic tool to help teachers pinpoint areas of misunderstanding with their students. These questions are arranged from easy to more challenging.

Consider using the more difficult questions as a whole-of-class or small group activity, where students are encouraged to share their various strategies and methods. Although students have to work individually on the tests, whole-group discussion and sharing of problem-solving strategies is an effective teaching strategy that builds students’ skills and confidence.

Some other ways of developing problem-solving skills and strategies include providing structures for solving problems such as the four-step model first outlined by George Polya in 1945. An abbreviated version is given below. This model gives students a way of structuring their thinking and a starting point if they don’t know where to begin.

1. Understanding the problem.
2. Devising a plan.
3. Carrying out the plan.
4. Looking back.

**Some other ideas for supporting problem solving include:**

- Read the question and restate what the problem asks you to find.
- Circle the numbers you need to use.
- Write the problem as a number sentence or sentences if more than one step.
- Estimate what the answer might be or pick an answer you are sure is wrong and say why it isn’t right.
- Solve the number sentence.
- Check your answer and make sure it is reasonable.
1  Amy has 15 books, John has 24 books and Sam has 11 books.

How many books altogether?

Question 1 is a simple addition of three numbers. Ensure that students read the question and restate what they have to find.

Key: 50

2  What is the total mass of these three cars?

- 3750 kg
- 4550 kg
- 4650 kg
- 5650 kg

Question 2 requires students to add three numbers with regrouping of the tens. Students need to find the numbers from the graphics.

Key: C
3  Gus is in a bike race.
Gus has ridden 8 kilometres on his bike.
How much further does he need to ride to finish?

Question 3 uses a diagram to represent the problem. The diagram provides some of the information needed to answer this question and also gives the students a “number line” or measurement model to assist with their calculations. Encourage students to position Gus on the diagram.
Students may choose to use either subtraction or counting on (addition) to solve this problem.

Key: 13

4  Liz planted 350 seeds.
298 plants grew.
How many seeds did not grow?

Question 4 requires knowledge of both addition and subtraction. Some students may prefer to count-on rather than perform the algorithm. It is important that students identify what they need to solve and plan how they are going to solve it. It is also important to highlight to students the significance of the “not” in the question. Sometimes students misread or misinterpret a question when it is framed in the negative.

Key: B
5 Gina went to the shop and spent $13.80.
This is the change she received.

How much money did Gina start with?

$  

NAPLAN data show that approximately 70% of students are able to solve a subtraction problem involving money. This question is more challenging as it requires students to interpret the written and graphical representation of money as well as understand the concept of receiving change for a transaction.

Key: $20 or $20.00

6 A plane has 180 seats.
49 seats have people sitting on them.
How many seats are empty?

131 seats

Question 6 tests subtraction presented as a missing addend or missing value problem. Students know what the total is and they are given one of the two values. They need to work out how to find the “missing value” or difference. Students could use either addition or subtraction (i.e. counting on and counting back). Being able to make the numbers manageable would also assist students to do this mentally. If they know that 1 more added to 49 makes 50, 180 less 50 is a much easier calculation than 180 less 49. They will just need to remember to add the 1 more to the answer.

Key: 131 seats
7 Last week Harry collected 125 cans for recycling.
   This week he collected the number of cans shown in this table.

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>2</td>
<td>23</td>
<td>50</td>
<td>15</td>
</tr>
</tbody>
</table>

How many more cans did Harry collect this week than last week?

☐ 261  
☐ 136  
☐ 21   
☐ 11

Question 7 requires two calculations: first the addition of five numbers, then the subtraction of this total from a value. Students should carefully read this question and restate it in their own words. Circling the information that they need to use may help as well.

Key: D

8 Dad scored 60 points in a game.
   Kate scored 15 points more than Dad.
   Jack scored twice as many points as Kate.

How many points did Jack score?

Question 8 seems easy but the difficulty lies in working out what has to be calculated. There are two numbers written in the problem. Many students will want to either add or subtract them. Students need to read the problem carefully and work out what it is they need to do.

Key: 150
On sports day Jane threw 4 balls into these buckets.

![Bucket image]

All four balls landed in the buckets.

Jane worked out her score.

Which of these scores is it **impossible** for Jane to have received?

- 12 points
- 14 points
- 19 points
- 20 points

Some test items require students to do several calculations to find a solution. These problems are known as multi-step problems and are usually quite challenging. Students need to read carefully and plan what to do. Encourage students to write on paper any working out they need to do. Questions 9 and 10 are examples of multi-step problems.

Key: C

Four friends wanted to have a turn on the jumping castle.

![Jumping castle image]

What is the difference in cost between buying 4 single tickets and buying 4 tickets using the special offer?

$ 

Key: $2 or $2.00