

## Grade 3 Lesson Summary

### Overall Objectives

This lesson will help students to:

- Add 2 two-digit numbers mentally;
- Explain mental computation strategies.

### Learning Expectations

Students will:

- Understand and explain basic operations (addition, subtraction, multiplication, division) involving whole numbers by modelling and discussing a variety of problem situations (e.g., show division as sharing, show multiplication as repeated addition); 3m4
- Select and perform computation techniques (addition, subtraction, multiplication, division) appropriate to specific problems and determine whether the results are reasonable; 3m7
- Solve problems and describe and explain the variety of strategies used; 3m8
- Mentally add and subtract one-digit and two-digit numbers; 3m28
- Use appropriate strategies (e.g., pencil and paper, calculator, estimation, concrete materials) to solve number problems involving whole numbers; 3m32

The code that follows each learning expectation comes from the Ontario Curriculum Unit Planner. See [www.ocup.org](http://www.ocup.org) for further details.

### Materials

- Base-ten blocks (tens and ones)
- Poster of Prizes
- Letter written on chart paper:

Hello everyone,

I am so excited! I've won 100 free shopping points just like your teacher. I've decided that I'm going to get the kite. But I wonder whether I will have enough points to buy other prizes after I pay 22 points for the kite. Could you prepare a list of all the prizes I could buy after I pay for the kite? I don't mind getting more than one of any item.

Let me know how many points everything will cost too.

P.S. Your teacher tells me that you are learning to do mental computations. Why don't you try to figure all of this out in your head!

- Home Connections – “In My Head!” Activity Sheet (one per student)

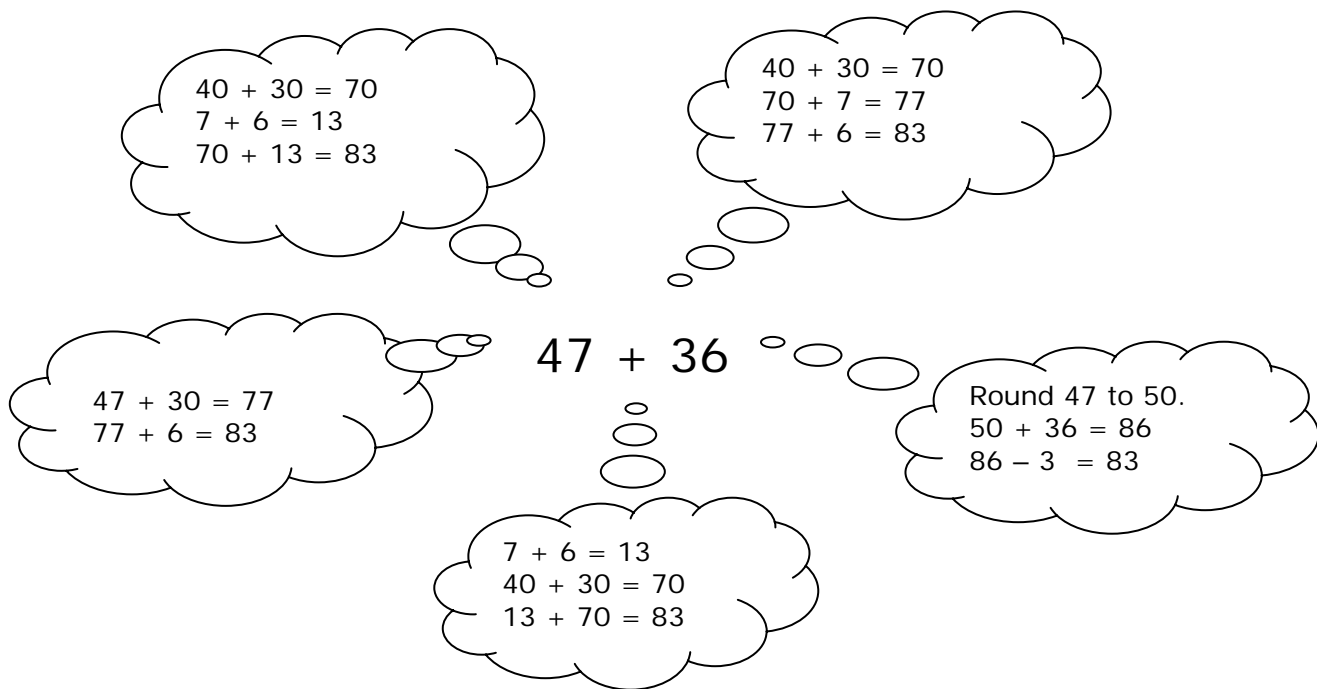
## Approach

### Get Started

In a guided learning session:

- Explain to the students that you have won 100 free shopping points from a department store.
- Show the students the poster of prizes and discuss the number of points required for each item.
- Ask the students to calculate, in their heads, the number of points required to purchase the camera and T-shirt ( $47 + 36$ ).
- Ask students to explain how they answered the question, and to show their thinking using base-ten blocks.
- Repeat by having students figure out the number of points needed for other combinations of prizes.

Some possible ways to mentally calculate  $47 + 36$  (the points for the camera and T-shirt) are given below. Similar procedures can be applied to solve other addition questions in this lesson.



Note: When students explain that they are adding tens, as in the top two examples, encourage them to say “forty plus thirty” rather than “four plus three”.

*Work on It – Pose a Problem*

In a guided learning session:

- Present a problem by reading the letter written on chart paper.
- Ask the following questions to help students understand the problem:
  - What do we need to find out?
  - What information is important to know?
  - What is meant by “mental computation”?
- Clarify the problem-solving task and expectations for students’ work.

*Work on It – Observe the Students*

In a shared learning session:

- Observe how well students are able to identify prizes that can be purchased with the available points.
- Probe students’ thinking by asking questions such as:
  - What is one way to answer this question in your head?
  - How can you show your thinking using the base-ten blocks?
  - Do you have another way to answer this question?

*Reflect and Connect*

In a guided learning session:

- Ask the students to identify prizes that can be purchased with the shopping points. Ask them to explain their mental computation strategies, and to show their thinking using base-ten blocks.
- Discuss and compare the various strategies that students used. Emphasize that different methods are possible, but that all methods result in the same answer.

### Assessment

Observe students to assess how well they:

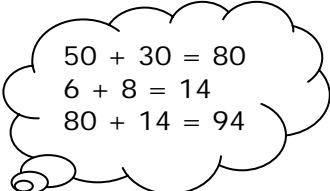
- Recall basic facts in mental calculations;
- Use strategies such as rounding (using 40 instead of 39), compensating (changing  $36 + 39$  to  $35 + 40$ ), and grouping tens (in  $47 + 39$ , adding  $40 + 30$  first);
- Develop and apply more than one mental computation strategy;
- Explain the steps taken to answer a question mentally;
- Model their thinking using concrete materials such as base-ten blocks.

### Adaptation/Extensions

For students who are not ready to add and subtract 2 two-digit numbers mentally, provide questions such as  $26 + 3$ ,  $68 + 5$ , and  $41 - 5$ . You might also provide questions that involve adding or subtracting multiples of 10 such as  $29 + 30$ ,  $40 + 33$ , and  $66 - 30$ .

Challenge students to find more than one strategy for mentally answering addition and subtraction questions. Have them show their methods using a paper-and-pencil algorithm. Here is an example of how a mental strategy might be recorded as a paper-and-pencil algorithm.

Thinking cloud and addition algorithm:



56 + 38

$$\begin{array}{r}
 56 \\
 +38 \\
 \hline
 80 \\
 \underline{14} \\
 94
 \end{array}$$

### Home Connections

Students' family members may not be familiar with mental computation strategies because mental arithmetic was not part of their mathematics instruction when they were in school. The Home Connections – "In My Head!" Activity Sheet invites family members and students to solve addition problems using mental computation.