

# CHAPTER 2: Foundations of Addition and Subtraction

## Introduction

In this chapter, teachers explore how young children build the skills to add and subtract small quantities (0–10). Teachers are encouraged to complete the mini-modules in order to build a strong understanding of how children develop knowledge of addition and subtraction.

### Mini-Modules in This Chapter

- A) Understand addition
- B) Understand subtraction
- C) Apply addition and subtraction

### Goals of the Chapter

This chapter aims to help teachers:

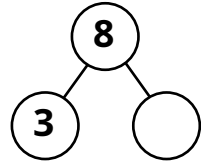
- Identify and describe how children develop an understanding of addition and subtraction.
- Use different materials and strategies to add and subtract quantities.
- Develop new teaching practices.

### Key terms

<b>Approximate</b>	Close to the actual amount, but not exact
<b>Calculation</b>	A way of finding a quantity or answer using math operations
<b>Estimation</b>	Using one's best judgment to find an approximate number or calculation
<b>Fact family</b>	A group of related facts that have the same three numbers (e.g., $3 + 5 = 8$ , $5 + 3 = 8$ , $8 - 5 = 3$ , $8 - 3 = 5$ )
<b>Justification</b>	An explanation of the process used to solve a problem or find an answer
<b>Operations</b>	Addition, subtraction, multiplication, and division
<b>Problem solving</b>	Applying math skills and knowledge to find ways to solve problems

## Thinking Mathematically: Estimation, Problem Solving, and Justification

As children develop addition and subtraction skills, there are other math skills that can be developed simultaneously. Addition and subtraction activities provide a good opportunity for children to develop estimation, problem solving, and justification skills.

Skills	Description	Example
<b>Estimation</b>	Children use their judgment to find an approximate number. For example, they may guess how many objects are in a group, or the cost of two items while shopping. In math class, children can give their “best guess” before solving a problem.	You ate 4 mangos in the morning, 3 mangos in the afternoon, and 2 at night. About how many mangos did you eat? What is your best guess?
<b>Problem solving</b>	Children apply their understanding of addition and subtraction to develop processes to solve various types of problems.	Find a missing number in a number bond: 
<b>Justification</b>	Children are asked to explain and justify the problem-solving process they used. There is often more than one way to solve a math problem, and teachers should accept these different ways when asking children to justify their ideas. The problem-solving processes used by children are just as important as finding the correct answer. When we understand children’s thinking, we are able to identify any misconceptions and support their learning.	Explain how you found the missing number in the number bond.  Some examples are: <ul style="list-style-type: none"> <li>• By taking 8 counters and forming 2 groups, with 3 and 5 members.</li> <li>• By counting back by 3 from 8 (7, 6, 5).</li> <li>• By using an addition fact (<math>3 + 5 = 8</math>).</li> </ul>

## Connections with Other Mathematical Concepts

### COMPOSITION AND DECOMPOSITION

Composition and decomposition are introduced in *Chapter 1: Numbers and Quantities*. Composition is putting a number together using its parts, and decomposition is breaking a number down into its parts. Practice with composition and decomposition prepares children to add and subtract.

### OPERATIONS: MULTIPLICATION AND DIVISION

Children will be more prepared to multiply and divide if they already have a good understanding of addition and subtraction. Multiplication is often taught as repeated addition, and division can be taught as repeated subtraction. Multiplication and division also have an “opposite” relationship, like addition and subtraction.

### OPERATIONS: ADDITION AND SUBTRACTION OF LARGER NUMBERS

To add and subtract larger numbers (e.g.,  $64 + 23$ ), children need to have a good understanding of how to add and subtract numbers from 1 to 10. Solving problems like this will be easier if they can recall the sums of one-digit numbers from memory. For example, if they know that  $6 + 2 = 8$ , then they can know that  $60 + 20 = 80$ ,  $600 + 200 = 800$ , etc.



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