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Lesson 1 UNDERSTAND ADDITION AND SUBTRACTION

LESSON OBJECTIVES

Children will:

- Count on to add and count back to subtract.

RELATED AUSTRALIAN CURRICULUM CONTENT DESCRIPTIONS

See page 24 to cross-reference this lesson with aligned Australian Curriculum content descriptions.

PREREQUISITES

Children should be able to:

- Count forward and back using numbers up to 20.
- Use a number line.

VOCABULARY

PAGE 4

- **add:** combine two or more groups
- **count on:** a way to add

PAGE 6

- **subtract:** take away, remove or compare
- **count back:** a way to subtract

MATHS BACKGROUND

In this lesson, children learn how to add by counting on and how to subtract by counting back.

To count on, children begin at the first addend and add by counting on the second addend. The number where they stop counting is the sum. To solve $4 + 3$, begin at 4 on a number line and count on 5, 6 and 7 to find the sum of 7.

To count back, children do the opposite. To solve $8 - 2$, begin at 8 and count back on a number line to 7 and then 6 to find the difference, 6.

The skills of counting on and counting back are important tools for children in learning the basic addition and subtraction facts. It helps them to understand how addition and subtraction work.

Modelled Instruction

LESSON 1 UNDERSTAND ADDITION AND SUBTRACTION
PART ONE

How can you count on to add?

Explore

How many is 4 plus 2?
☆☆☆☆ ☆☆

You can count all of the stars to find $4 + 2$.

How can you find $4 + 2$ without counting objects?
You can use a number line. Count on to **add**.

$4 + 2$
 $4 + 2 = 6$

Think

What is $5 + 2$?
Start at 5.
Count on 2.

Connect

Find $5 + 2$. Use the number line.

You stop at 7, so $5 + 2 = 7$.

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Guided Instruction

Understand addition and subtraction

Let's Talk Tell how to add 6 and 3 using a number line.

Think It Through

Solve.
What is $10 + 2$?
Start at 10.
Count on 2.

Solution: $10 + 2 = 12$

Your Turn **Solve.**

1. What is $9 + 4$?

Ⓐ 14
● 13
Ⓒ 11
Ⓓ 5

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AT A GLANCE

Children activate their background knowledge about counting and then learn how to add by counting on.

STEP BY STEP

PAGE 4

- Introduce the **Question** at the top of the page.
- Have children study the number line shown in **Explore**. The numbers tell which direction is more and which direction is less. Point out that they can use a number line to add.

Tip: Have children count on the first number line from 0 to 4 and then from 4 to 6 as practice for finding the sum on the number line.

EAL/D Support: Children may not understand the phrase *count on*. Tell them to think of the phrase *add on* to show they are adding one group *on* to another to help them remember that to add they count on.

- Read **Think** with children. Tell children to start at the first number in the number sentence.
- Have children look at the number line in **Connect**. Discuss how the number line is helpful to show counting on.

PAGE 5

- Organise children in pairs or groups for **Let's Talk** and monitor their discussions.
- Be sure children understand that they start at 6 and count on 3 to find the sum, 9.
- Read the **Think It Through** problem with children.
- Guide children as they solve the problem. Help them use the number line to count on.
- Monitor children as they complete **Your Turn**. Then discuss the correct answer.

Error Alert: Children who chose C may have only counted on 2, as shown in the previous problem.



ADDITIONAL ACTIVITY

See **Hands-on Activity** (page 36).

Modelled Instruction

PART TWO

How can you count back to subtract?

Explore
 You can count back to **subtract**.
 $8 - 3$
 $8 - 3 = 5$

Think
 What is $7 - 4$?
 Start at 7.
 Count back 4.

Connect
 Find $7 - 4$. Use the number line.

 You stop at 3, so $7 - 4 = 3$.

Let's Talk
 Tell how to subtract 5 from 9 using a number line.

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Guided Instruction

Understand addition and subtraction

Think It Through

Solve.
 What is $13 - 8$?

Count back to subtract.

a. Start at 13.
 b. Count back 8.
 c. On what number do you stop? 5

Solution: $13 - 8 = \underline{5}$

Your Turn **Solve.**
 2. What is $12 - 9$?

$12 - 9 = \underline{3}$

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AT A GLANCE

Children learn how to subtract by counting back.

STEP BY STEP

PAGE 6

- Introduce the **Question** at the top of the page.
- Read **Explore** with children. Help children to find 8 on the number line and then count back by 3 to end at 5.
- Read **Think** with children. Have children explain how the first number tells the starting point on the number line.
- Guide children through the steps in **Connect**. Discuss how they can count back to subtract.

EAL/D Support: Tell children that counting *back* means to count toward 0. Encourage children to say each number out loud as they count back.

- Organise children in pairs or groups for **Let's Talk** and monitor their discussions.
- Make sure children understand that they start at 9 and count back by 5 to find the difference of 4.

PAGE 7

- Read the **Think It Through** problem with children.
- Guide children as they solve the problem. Pause for children to fill in missing information. Then discuss each response.

Tip: Remind children that they start at the first number and count back by the second number.

- Monitor children as they complete **Your Turn**. Then discuss the correct answer.

Error Alert: Children who answered 2 counted back 1 too many.



ADDITIONAL ACTIVITY

See **Reteaching Activity** (page 36).

Modelled Practice

PART THREE: Choose the right answer

Solve the problem. Is your answer correct?

Solve

$7 + 5 = \square$

A 2 B 11
 C 12 D 13

Check your answer.

$7 + 5 = \square$

Start at 7.
Count on 5.

$7 + 5 = 12$

So, the correct answer is **C**.

Why are the other answer choices not correct?

| | |
|----------------------------|--------------------------------------|
| <input type="radio"/> A 2 | Add 7 + 5. Do not subtract $7 - 5$. |
| <input type="radio"/> B 11 | Count on 5. Do not count on 4. |
| <input type="radio"/> D 13 | Count on 5. Do not count on 6. |

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Guided Practice

Understand addition and subtraction

Your Turn Solve each problem.

- Count on to add.
- Count back to subtract.

3. What is $8 + 6$?

A 2 B 4 C 13 D 14

4. What is $14 - 5$?

A 8 B 9 C 10 D 19

5. $5 + 6 = \square$

A 11 B 12 C 13 D 14

6. $13 - 7 = \square$

A 5 B 6 C 12 D 20

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AT A GLANCE

Children reinforce their understanding of counting on to add through solving a multiple-choice problem and analysing correct and incorrect answer choices.

STEP BY STEP

PAGE 8

- Tell children that this page models finding the correct answer to a multiple-choice problem.
- Help children read the problem in **Solve** and choose the best answer. Remind them to check their maths.
- Examine **Check** with children. Discuss the correct and incorrect choices.

PAGE 9

- Monitor children as they complete **Your Turn**.
- Organise children in pairs or small groups and have them discuss why each answer choice is correct or not and what errors may have been made.
- Review the answers with the class.



ADDITIONAL ACTIVITY

See Vocabulary Activity (page 36).

Answer Analysis

3. A Subtracted instead of added.
 B Incorrectly subtracted instead of added.
 C Counted on 1 too few.
 D Starting at 8 and counting on 6 gives a sum of 14.
4. A Counted back 1 too many.
 B Starting at 14 and counting back 5 gives a difference of 9.
 C Counted back 1 too few.
 D Added instead of subtracted.
5. A Starting at 5 and counting on 6 gives a sum of 11.
 B Counted on 1 too many.
 C Counted on 2 too many.
 D Counted on 3 too many.
6. A Counted back 1 too many.
 B Counting back 7 from 13 is 6.
 C Mistook the 7 for a 1.
 D Added instead of subtracted.

Modelled Practice

PART FOUR:

Study the model.

Student model

What is $11 - 8$?
 Show your work.
 Start at 11.
 Count back 8.

Stop at 3.

Solution: $11 - 8 = 3$

Explain how you got your answer.
 I used the number line to subtract. I started at 11. Then I counted back 8. I stopped at 3, so $11 - 8 = 3$.

Show each step.

Answer the question.

Give details.

Use maths words.

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Guided Practice

Understand addition and subtraction

Your Turn: Solve the problem.

7. What is $13 - 4$?
 Show your work.

Start at 13.
 Count back 4.

Stop at 9.

Solution: $13 - 4 = 9$

Explain how you got your answer.
 I used the number line to subtract. I started at 13. Then I counted back 4. I stopped at 9, so $13 - 4 = 9$.

CHECKLIST

Did you...

show each step?

answer the question?

give details?

use maths words?

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AT A GLANCE

Children study a model answer to an extended-response problem.

STEP BY STEP

PAGE 10

- Tell children that this page shows a complete answer to the problem. It shows all the steps and explains the steps with maths words.
- Help children read the problem in **Show**. Discuss how each mathematical step, including drawing a model, leads to the solution.
- Read **Explain** with children. Help children find and circle the maths words in the explanation.
- Direct children's attention to the notes in the right margin. Tell children that these notes explain why the answer is complete.

PAGE 11

- Monitor children as they complete **Your Turn**.

Tip: Provide sentence starters to help children begin their answers to part four.

- Encourage children to follow the **Checklist** to write the best answer.
- Have children discuss their work with a partner. Then discuss the correct answer as a class.

Answer Analysis

7. See the sample answer. The answer shows all of the steps taken to solve the problem, including drawing a number line to show counting back. The solution answers the question. The explanation provides important details about how the problem was solved and uses the maths words *number line* and *subtract*.



ADDITIONAL ACTIVITY

See **Real-World Connection** (page 36).



ADDITIONAL ACTIVITY

See **School-Home Connection** (page 36).

Independent Practice

PART FIVE:

To solve addition and subtraction problems:

- count on to add.
- count back to subtract.

Solve each problem.

8. What is $8 + 7$?

Ⓐ 1 Ⓑ 13 Ⓒ 14 ● 15

9. $15 - 6 = \square$

Ⓐ 8 ● 9 Ⓒ 10 Ⓓ 21

10. $7 + 6 = \square$

Ⓐ 1 Ⓑ 12 ● 13 Ⓓ 14

11. Which number sentence matches the picture?

Ⓐ $3 + 4 = 7$ Ⓑ $7 + 9 = 2$ ● $7 + 2 = 9$ Ⓓ $9 - 7 = 2$

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Independent Practice

Understand addition and subtraction

12. $7 + 7 = \square$

Ⓐ 12 ● 14 Ⓒ 16 Ⓓ 77

13. What is $10 - 4$? Show your work on the number line.

Solution: $10 - 4 = \underline{6}$

14. Marc has 13 toy trucks. He gives 4 trucks to his brother. How many trucks does Marc have now?

Ⓐ 4 ● 9 Ⓒ 10 Ⓓ 17

15. What is $3 + 7$? Show your work.

Solution: $3 + 7 = \underline{10}$

Explain how you got your answer.

I drew a number line to help me add. I started at 3
on the number line. I counted on 7. I stopped at 10,
so $3 + 7 = 10$.

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AT A GLANCE

Children practise counting on to add and counting back to subtract to solve problems that might appear on a mathematics test.

STEP BY STEP

PAGES 12–13

- Tell children that they will practise solving addition and subtraction problems.
- Point out the tips at the top of page 12. Tell children that these are hints that will help them solve the problems.
- Tell children to complete problems 8–15 on pages 12 and 13. Encourage children to check their answers.
- Discuss the correct responses as a class.

Answers and Explanations

8. Ⓓ 7 counted on to 8 is 15.
9. Ⓑ Counting back 7 from 16 is 9.
10. Ⓒ $7 + 6 = 13$.
11. Ⓒ 2 counted on to 7 is 9.
12. Ⓑ $7 + 7 = 14$.
13. To find $10 - 4$, start at 10. Count back 4. The answer is 6.
14. Ⓑ Counting back 4 from 13 is 9.
15. See the sample answer. This answer shows all of the steps the child took to solve the problem, including drawing a number line to show counting on. The solution answers the question. The explanation provides important details about how the child solved the problem and uses the maths words *number line* and *add*.
(Also accept answers where children start at the larger number of 7 and count on 3 to reach 10.)



ASSESSMENT AND REMEDIATION

- Ask children to count back to find $12 - 4$. Provide a number line. (8)
- For children who are still struggling, use the chart below to guide remediation.
- After providing remediation, check children's understanding. Ask children to explain their thinking while solving $11 - 3$. (*Count back 10, 9, 8*)

| If the error is ... | Children may ... | To remediate ... |
|---------------------|-------------------------------|--|
| 7 | have counted back 1 too many. | Have children count back again, marking each tick on the number line as they count back to make sure they do not skip any numbers. |
| 9 | have counted back 1 too few. | Have children use the number line to count back 4 from 12 again. If they still arrive at 9, have them use 12 base-ten blocks and count as they remove 4 blocks. They can count 8 blocks remaining. |
| 10 | have counted back 2 too few. | Have children use base-ten blocks to model the subtraction. Have children repeat counting back from 12 by 4. Ask them to remove one block as they count to make sure they do not count a number twice. |



ADDITIONAL ACTIVITY

For children who have mastered the skills in this lesson, see **Challenge Activity** (page 36).

ADDITIONAL ACTIVITIES



Hands-on Activity

Use connecting cubes to demonstrate *count on* and *count back*.

Materials: 20 cubes for each pair of children

Provide cubes and remind children that each cube represents one. Have the first child think of two numbers to add (such as $7 + 2$) and then make a string of 7 cubes, saying, “Start at 7 and add 2.” The second child *counts on* by connecting 2 cubes to the string of cubes, counting, “8, 9”. Both children then write the number sentence: $7 + 2 = 9$. For *counting back*, one child makes a string of cubes and the other removes some of the cubes while counting back. Children write the number sentence. Allow each child to have three turns.



Reteaching Activity

Relate a number line to a part/part/whole model demonstrating how *adding can help to subtract*.

Materials: a number line showing 0 to 10 and 8 stars aligned over the numbers 0–8

Write “ $8 - 2$.” Ask children, “Where do we start?” Point to the star over the 8. Then ask children, “Do we count on or count back?” Lead them to see that subtraction means to count back. Say, “Let’s count back 2.” Remove the 8th star and then the 7th star while saying together, “7, 6”. Children will see that counting back 2 stars leaves 6 stars.

To check, count on 2 from 6 to see that $6 + 2 = 8$.



Vocabulary Activity

Play “Two-Column Matching” to reinforce terms.

Give each child a worksheet with a list of vocabulary terms in the left column and a drawing that corresponds to each term in the right column, in scrambled order. Suggested illustrations:

- plus: the “+” sign
- minus: the “-” sign
- equals: the “=” sign

- count on: give an addition example and show counting on on a number line to find the sum
- count back: give a subtraction example and show counting back on a number line to find the difference

Have children draw lines to match the words with the drawings. Have pairs of children go over their work together.



Real-World Connection

Relate an everyday activity to the meaning of *count on* and *count back*.

Help children understand how going up steps is like counting on and going down steps is like counting back. Count the number of steps. For example, if there are 6 steps, have one child stand on the top step, two children on step 4 and a fourth child on step 1. Then ask one of the middle children to walk *up* the stairs and *count on* starting at 4 until reaching the top step: 4, 5, 6. It takes 2 steps to go up from 4 to 6. Have the other middle child walk *down* and *count back*: 4, 3, 2, 1. It takes 3 steps to go down from 4 to 1. Write: $4 + 2 = 6$ and $4 - 3 = 1$.



School-Home Connection

Inform families about counting on and counting back.

Give each child a copy of the School-Home Connection activity sheet for Lesson 1 (page 157) to share with the family. The activity included in the letter is a game about counting on and counting back using fingers.



Challenge Activity

Write a number sentence based on a given number line.

Materials: number lines and models like those in parts one and two of the lesson

Show a number line and ask, “What number sentence does this number line show?”