

# TYPES OF ADDITION & SUBTRACTION WORD PROBLEMS

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Parent Symposium (Primary 1 & 2)

7 April 2018

# Outline

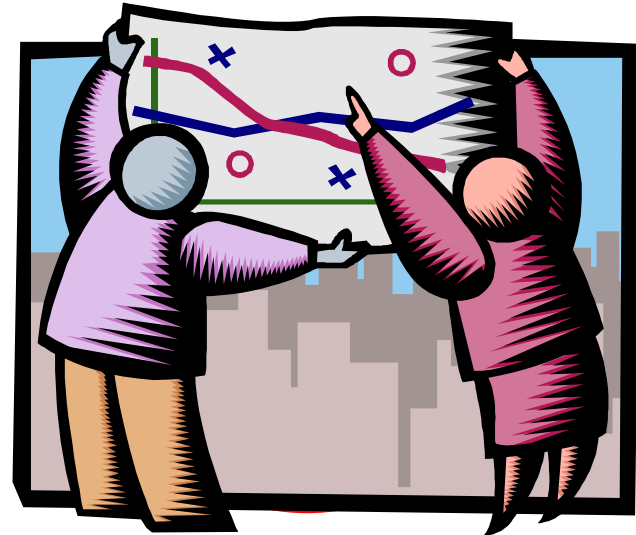
1. Problem solving process
2. Addition & Subtraction Word Problems
  - Part-Part-Whole
  - Join
  - Separate
  - Compare

# PROBLEM SOLVING PROCESS

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# Mathematics Curriculum

The primary aim of the Mathematics curriculum is to enable pupils to develop their ability in Mathematical **PROBLEM SOLVING**



# What Is Mathematical Problem Solving?

A process.....

where students use previously  
acquired knowledge, skills and  
understanding to satisfy the  
demands of a situation

# Problem Solving Process - SPARE

- **S**tudy the problem
- **P**lan
- **A**ct
- **R**easonableness
- **E**xplain

Study the Problem



Plan (choose a heuristic)



Act – Carry out the plan



Needs modification/ a new plan?

No  Checking

Is the answer Reasonable?

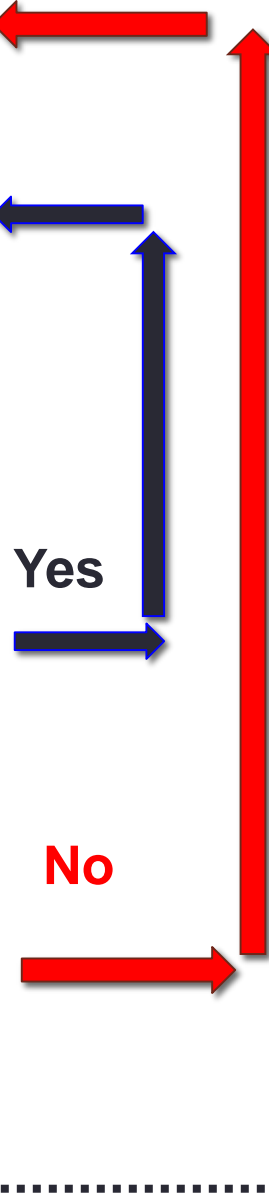
Yes 

Explain (Reflection)

## Problem Solving Process

### Explain (Reflection)

- Improving on the method used.
- Seeking alternative solutions.
- Extending the method to other problems.
- Can you explain what you did?



# Study the Problem

Understanding the question in terms of:

- Words.
- What needs to be found?
- What information is provided?
- Use picture / diagrams to understand the problem.
- Derive hidden information from given facts.



# Plan (Using Heuristics – Strategies in Problem Solving)

- Give a representation (draw a diagram, make a list, use equations)
- Make a calculated guess (guess & check, look for patterns, make suppositions)
- Go through the process (act it out, work backwards, before-after)
- Change the problem (restate the problem, simplify the problem, solve part of the problem)

(Source: Curriculum Planning & Development Division, MOE, Mathematics Syllabus Primary 2007)

# Act (Carry Out the Plan)

Ensure the following:

- **S**how and check all the steps
- **T**ransfer all numbers correctly
- **U**se correct units
- **N**eat

# Reasonableness

- Does the answer make sense?
- Is there any alternative method?
- What worked? What did not?

# Explain

Explain how your solution satisfy the conditions of the question?

# QUESTION TYPES

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Addition & Subtraction Word Problems

# Part-Part-Whole Problem

- There is no action.
- Focus on the relationship between whole and its parts
- The quantities involved are the parts of a whole.

Peter has 7 chocolate cookies and 4 butter cookies.  
How many cookies does he have in all?

**Total number of cookies ?**



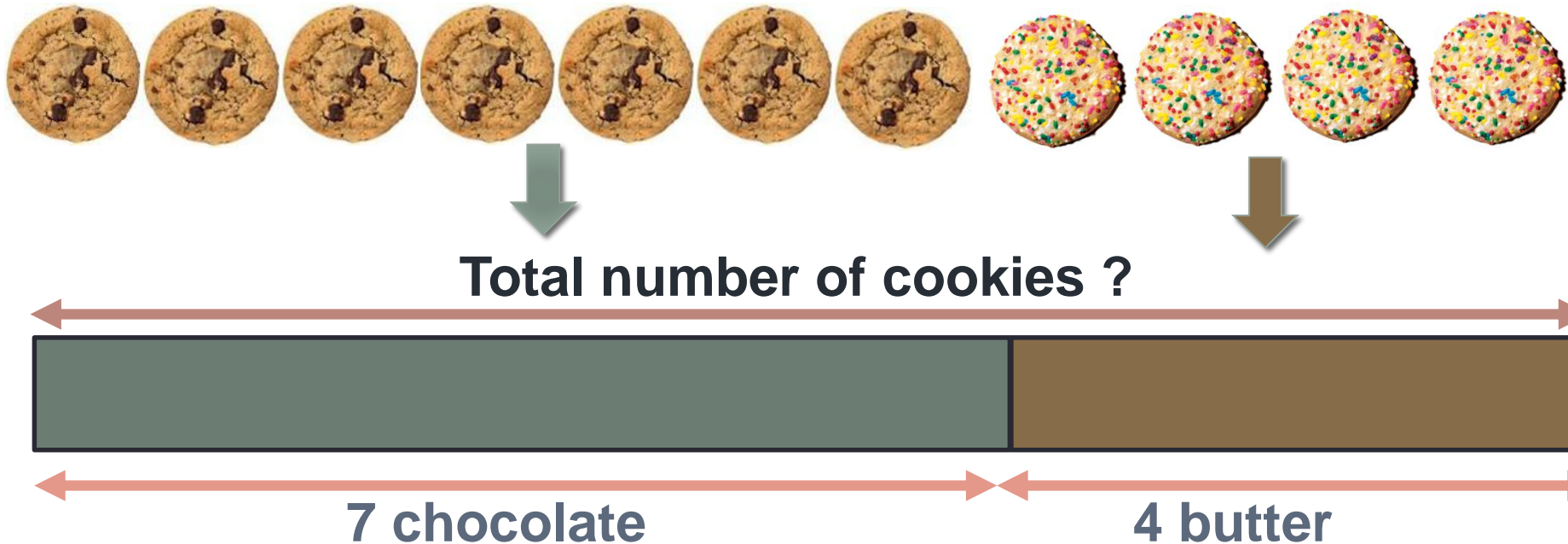
How many chocolate cookies does Peter have?

How many butter cookies does Peter have?

What do I need to find?

Peter has 7 chocolate cookies and 4 butter cookies.  
How many cookies does he have in all?

Transferring information in the question into a diagram,



$$\begin{aligned} \text{Total} &= 7 + 4 \\ &= 11 \end{aligned}$$

Ans: 11



Peter has 11 cookies. 4 are butter cookies and the rest are chocolate cookies. How many chocolate cookies does he have?



How many cookies does Peter have?

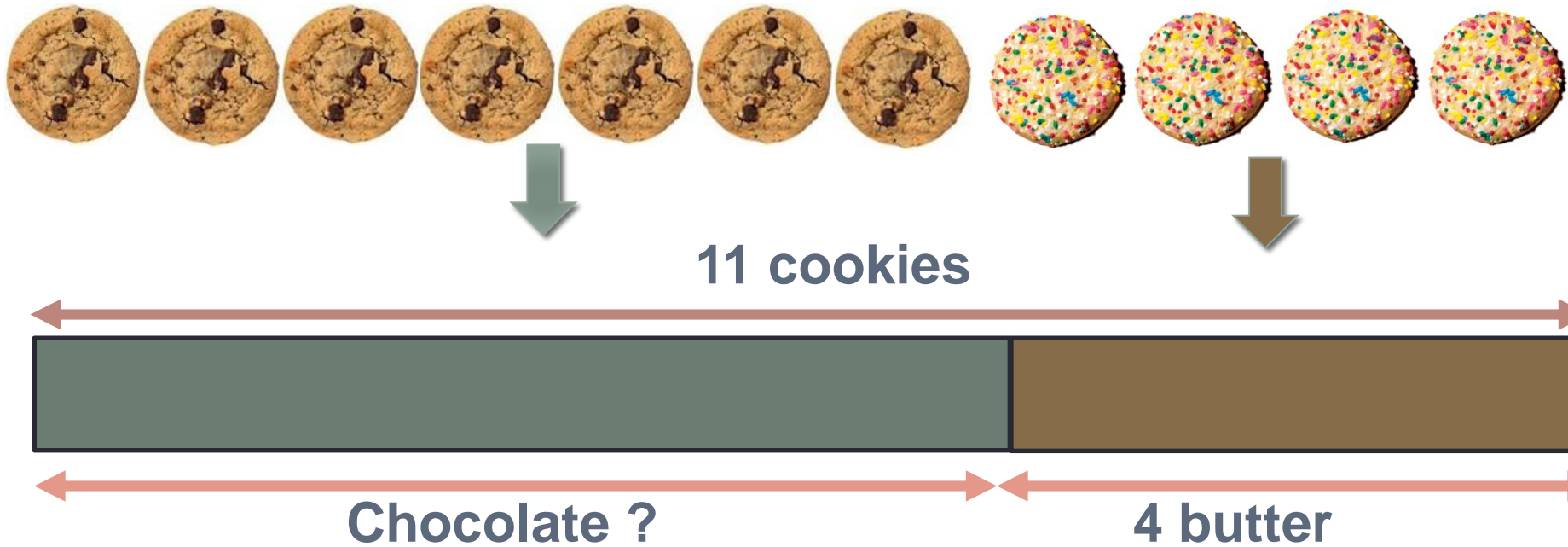
What are the two types of cookies Peter have?

How many butter cookies does Peter have?

What do I need to find?

Peter has 11 cookies. 4 are butter cookies and the rest are chocolate cookies. How many chocolate cookies does he have?

Transferring information in the question into a diagram,



$$\begin{aligned}\text{Chocolate} &= 11 - 4 \\ &= 7\end{aligned}$$

Ans: 7

Peter has 11 cookies. 7 are chocolate cookies and the rest are butter cookies. How many butter cookies does he have?



How many cookies does Peter have?

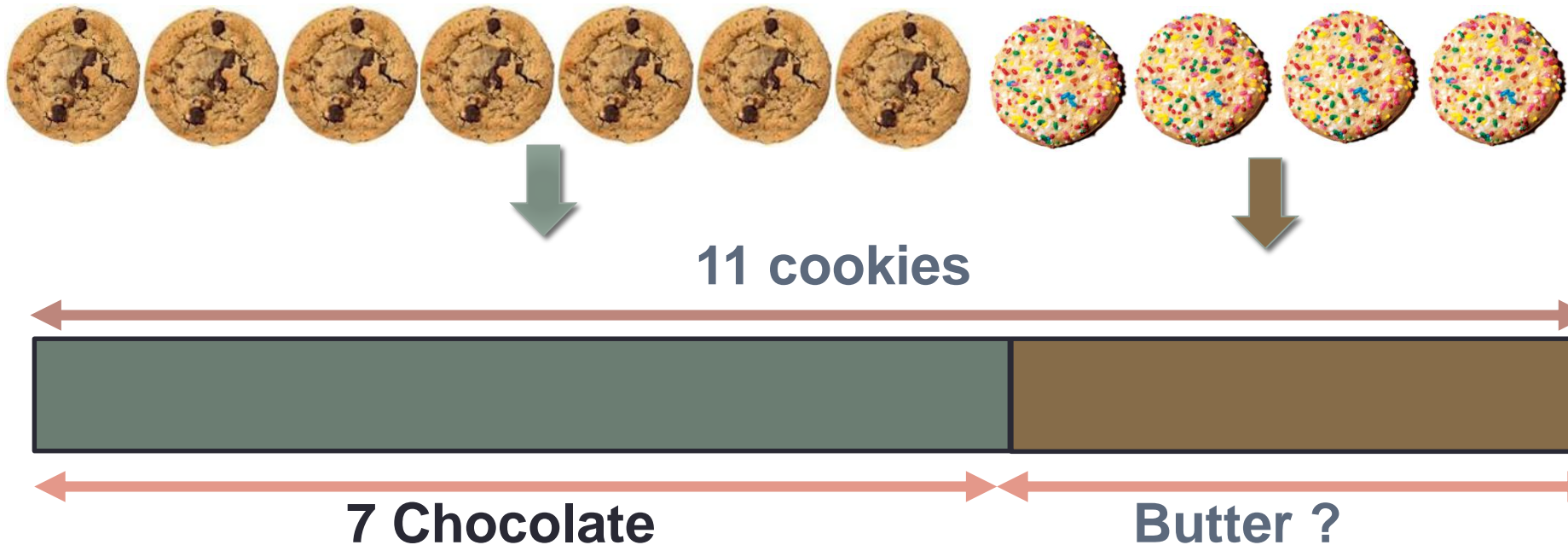
What are the two types of cookies Peter have?

How many chocolate cookies does Peter have?

What do I need to find?

Peter has 11 cookies. 7 are chocolate cookies and the rest are butter cookies. How many butter cookies does he have?

Transferring information in the question into a diagram,



$$\begin{aligned}\text{Butter} &= 11 - 7 \\ &= 4\end{aligned}$$

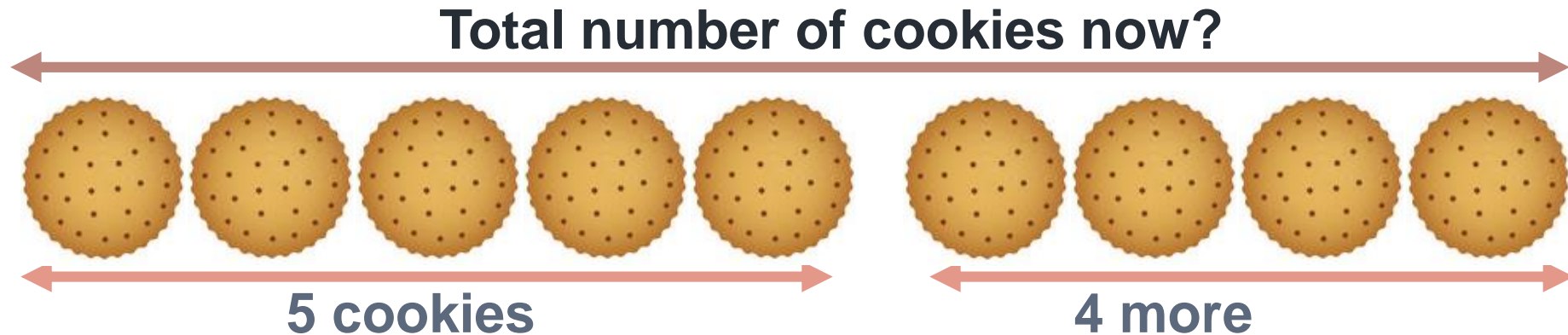
Ans: 4

# Join Word Problems

- An amount is added to the original.
- The 3 quantities involved are the :
  - starting amount
  - change amount
  - resulting amount

## Result Unknown

Peter had 5 cookies. Amy gave him 4 more cookies.  
How many cookies does Peter have now?



How many cookies did Peter have at first?

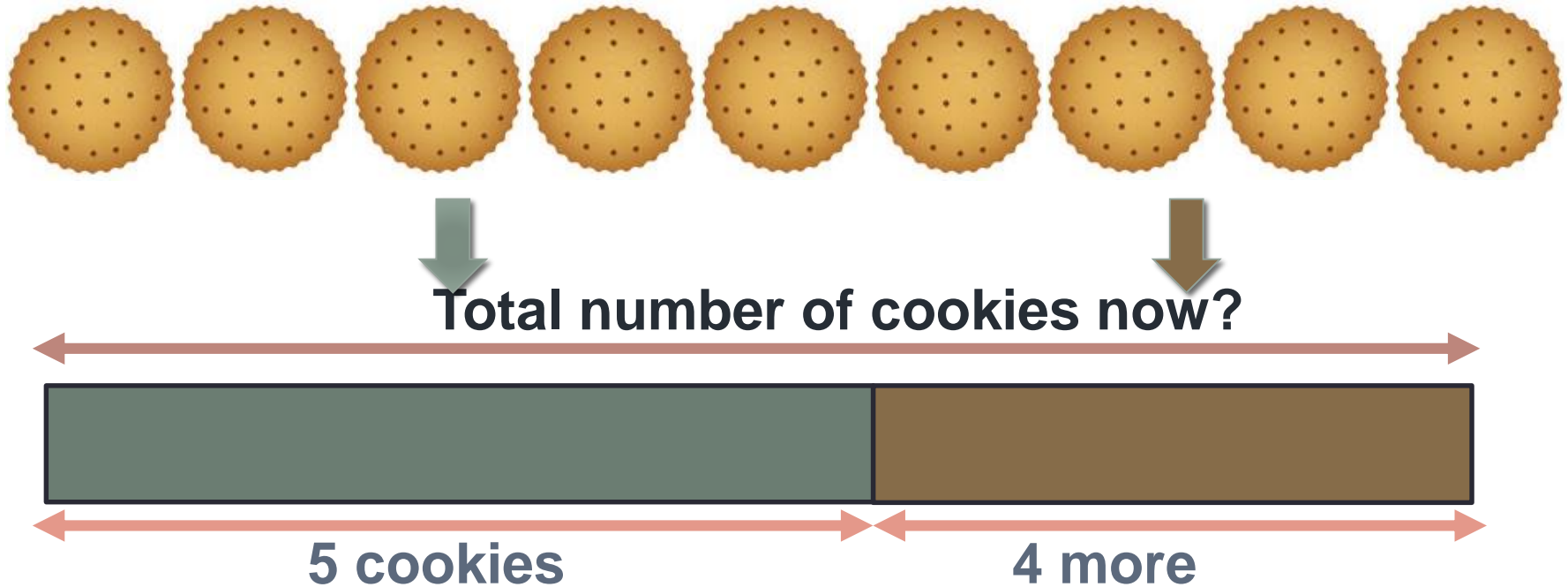
How many more cookies did Amy give him?

What do I need to find?

## Change Unknown

Peter had 5 cookies. Amy gave him 4 more cookies.  
How many cookies does Peter have now?

Transferring information in the question into a diagram,

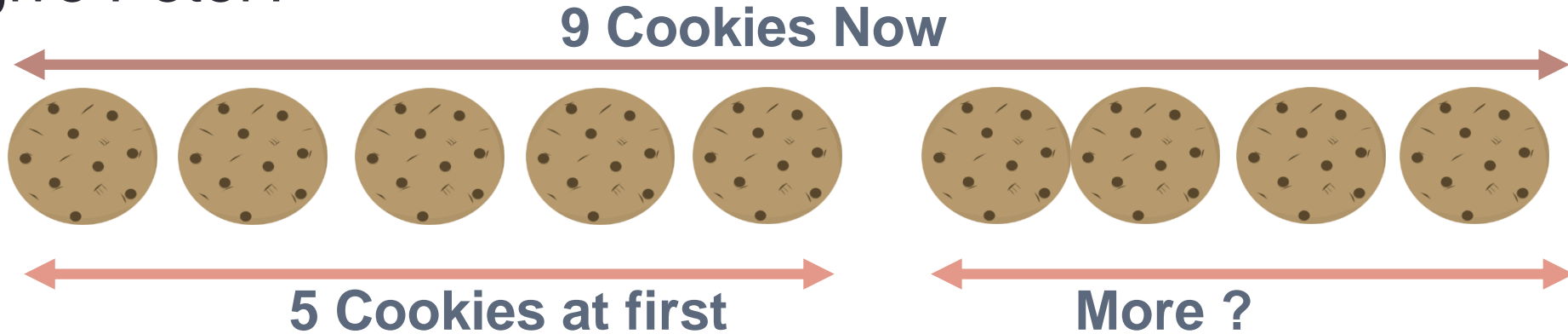


$$\begin{aligned}\text{Peter now} &= 5 + 4 \\ &= 9\end{aligned}$$

Ans: 9

# Change Unknown

Peter had 5 cookies. Amy gave him some more cookies. Now Peter has 9 cookies. How many cookies did Amy give Peter?



How many cookies did Peter have at first?

Who gave Peter more cookies?

How many cookies did Peter have after Amy had given him some more?

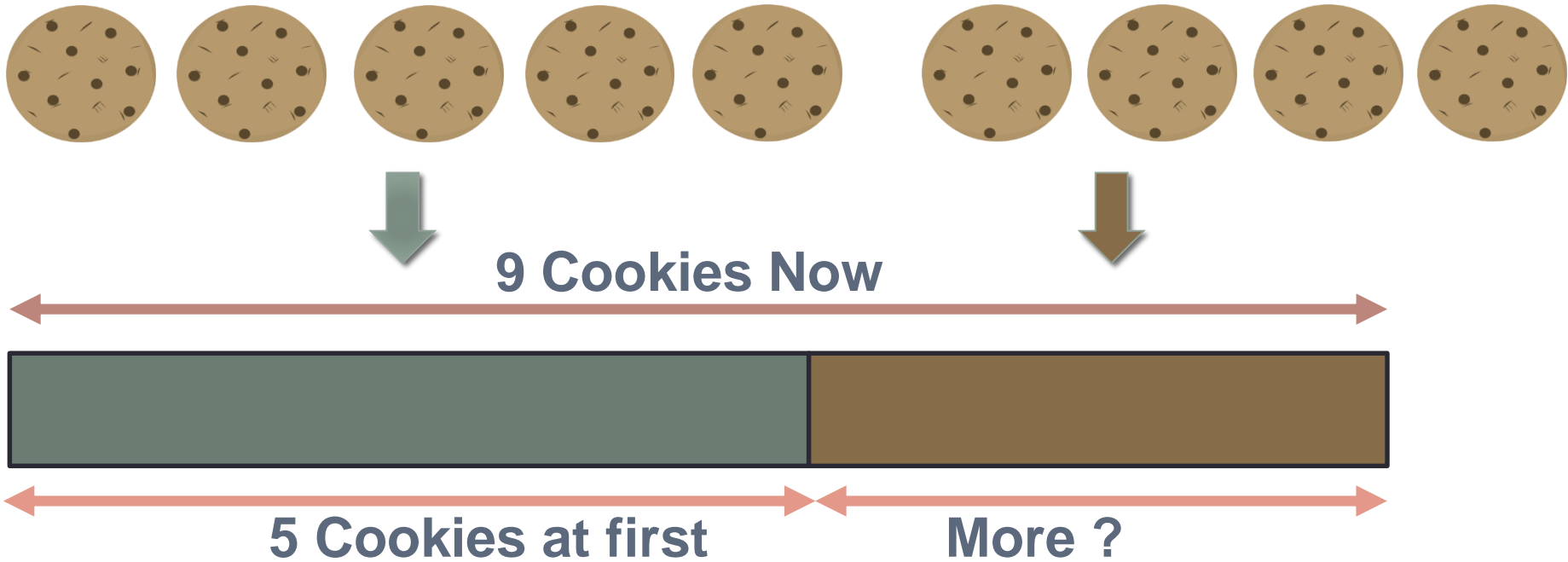
What do I need to find?



# Change Unknown

Peter had 5 cookies. Amy gave him some more cookies. Now Peter has 9 cookies. How many cookies did Amy give Peter?

Transferring information in the question into a diagram,

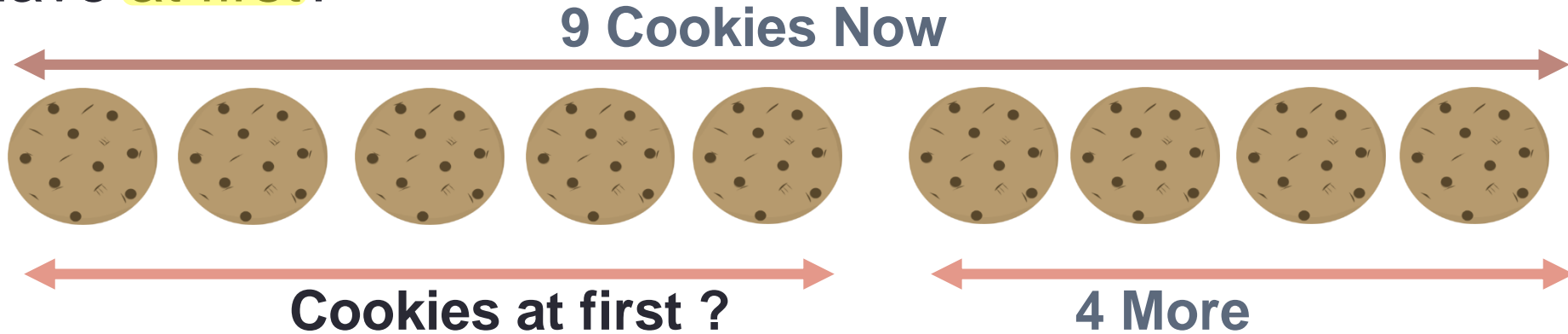


$$\begin{aligned} \text{Cookies from Amy} &= 9 - 5 \\ &= 4 \end{aligned}$$

Ans: 4

# Start Unknown

Peter had **some cookies**. **Amy** gave him **4 more cookies**. **Now** Peter has **9 cookies**. How many cookies did **Peter** have **at first**?



How many cookies did Peter have at first?

Who gave Peter more cookies? How many more?

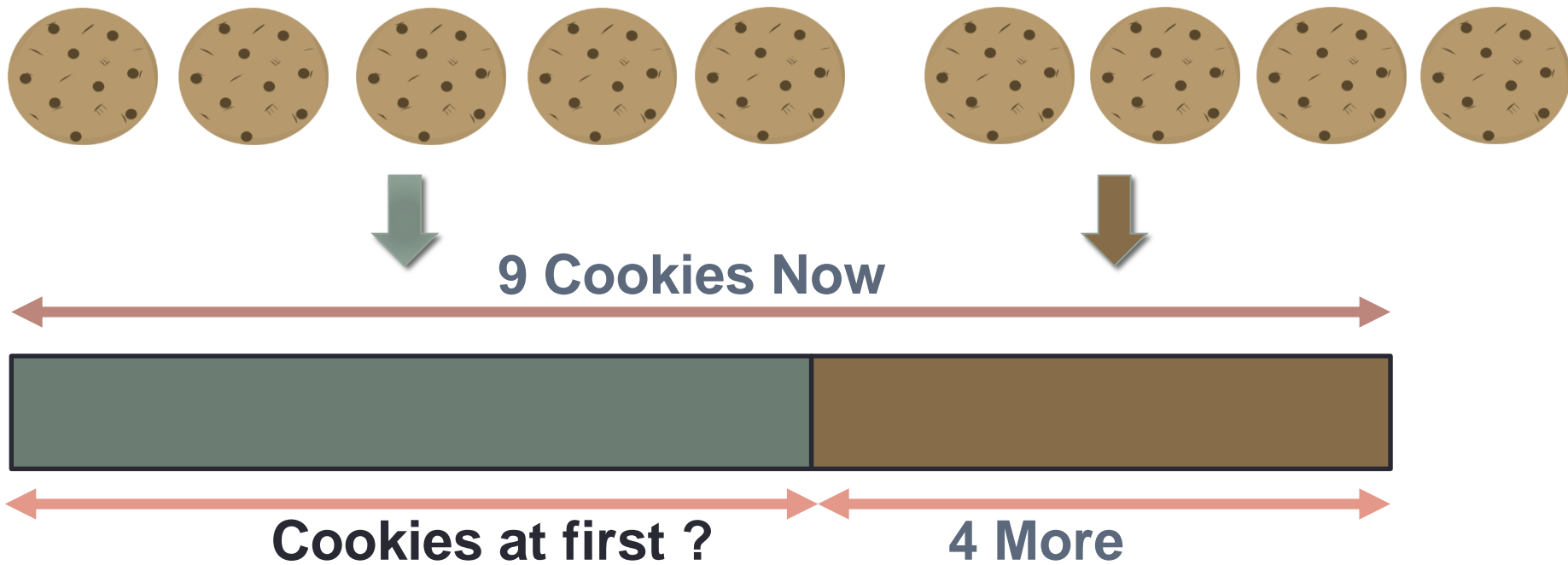
How many cookies did Peter have after Amy had given 4 more cookies?

What do I need to find?

## Start Unknown

Peter had some cookies. Amy gave him 4 more cookies. Now Peter has 9 cookies. How many cookies did Peter have at first?

Transferring information in the question into a diagram,



$$\begin{aligned} \text{At First} &= 9 - 4 \\ &= 5 \end{aligned}$$

Ans: 5

# Comparing Part-Part-Whole & Join Word Problems

## Part-part whole

Peter has 7 chocolate cookies and 4 butter cookies. How many cookies does he have?

## Join

Peter has 7 cookies. Amy gives him 4 more. How many cookies does he have now?

## Both solutions:

$$7 + 4 = 11$$

# Comparing Part-Part-Whole & Join Word Problems

## Part-part whole

Peter has 11 cookies. 4 are butter cookies and the rest are chocolate cookies. How many chocolate cookies does he have?

## Join

Peter has 4 cookies at first. Amy gives him a few more. Peter has 11 cookies now. How many cookies does Amy give him?

## Both solutions:

$$11 - 4 = 7$$

# Comparing Part-Part-Whole & Join Word Problems

## Part-part whole

Peter has 11 cookies. 7 are chocolate cookies and the rest are butter cookies. How many butter cookies does he have?

## Join

Peter has some cookies. Amy gives him 7 more. Peter has 11 cookies now. How many cookies does he have at first?

## Both solutions:

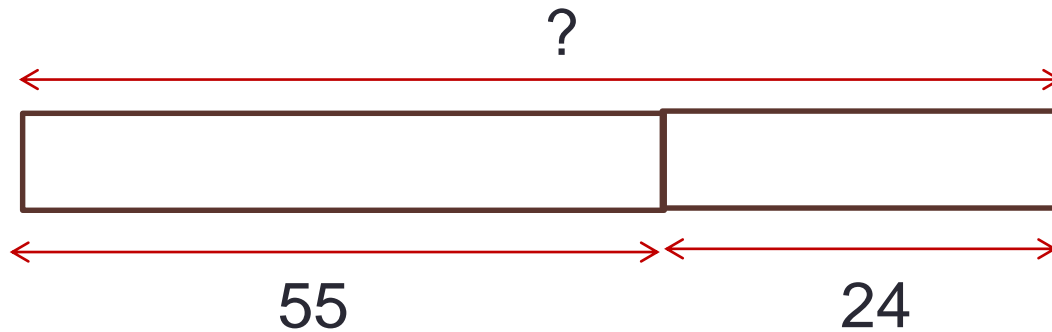
$$11 - 7 = 4$$

# HANDS-ON ACTIVITY 1

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Peter had 55 cookies. Amy gave him 24 more cookies. How many cookies does Peter have now?

(Result Unknown)



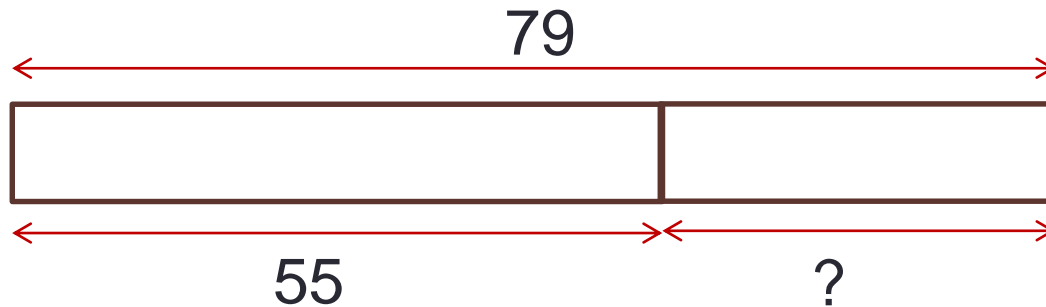
$$\begin{aligned}\text{Peter now} &= 55 + 24 \\ &= 79\end{aligned}$$

Ans: 79



Peter had 55 cookies. Amy gave him some more cookies. Now Peter has 79 cookies. How many cookies did Amy give Peter?

(Change Unknown)

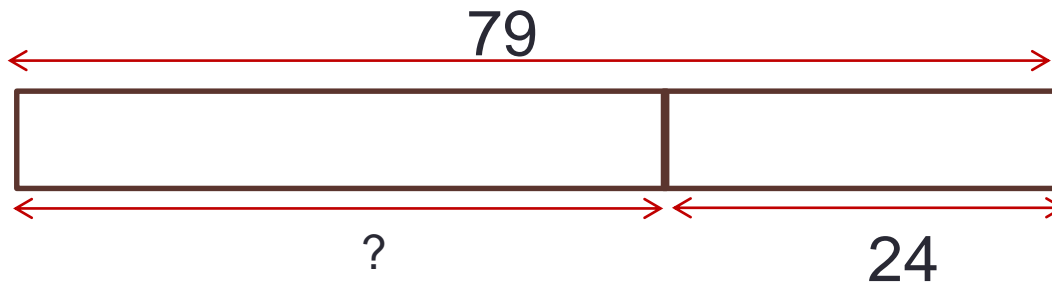


$$\begin{aligned} \text{Amy to Peter} &= 79 - 55 \\ &= 24 \end{aligned}$$

Ans: 24

Peter had some cookies. Amy gave him 24 more cookies. Now Peter has 79 cookies. How many cookies did Peter have at first?

(Start Unknown)



$$\begin{aligned} \text{At first} &= 79 - 24 \\ &= 55 \end{aligned}$$

Ans: 55

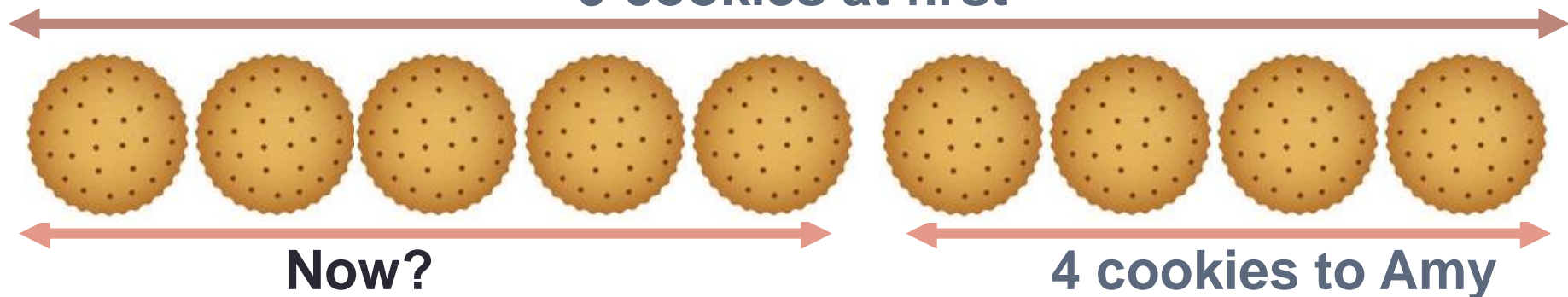
# Separate Word Problems

- An amount is removed from the original.
- The 3 quantities involved are the :
  - starting amount
  - change amount
  - resulting amount

## Result Unknown

Peter had 9 cookies. He gave 4 cookies to Amy.  
How many cookies does Peter have now?

9 cookies at first



How many cookies did Peter have at first?

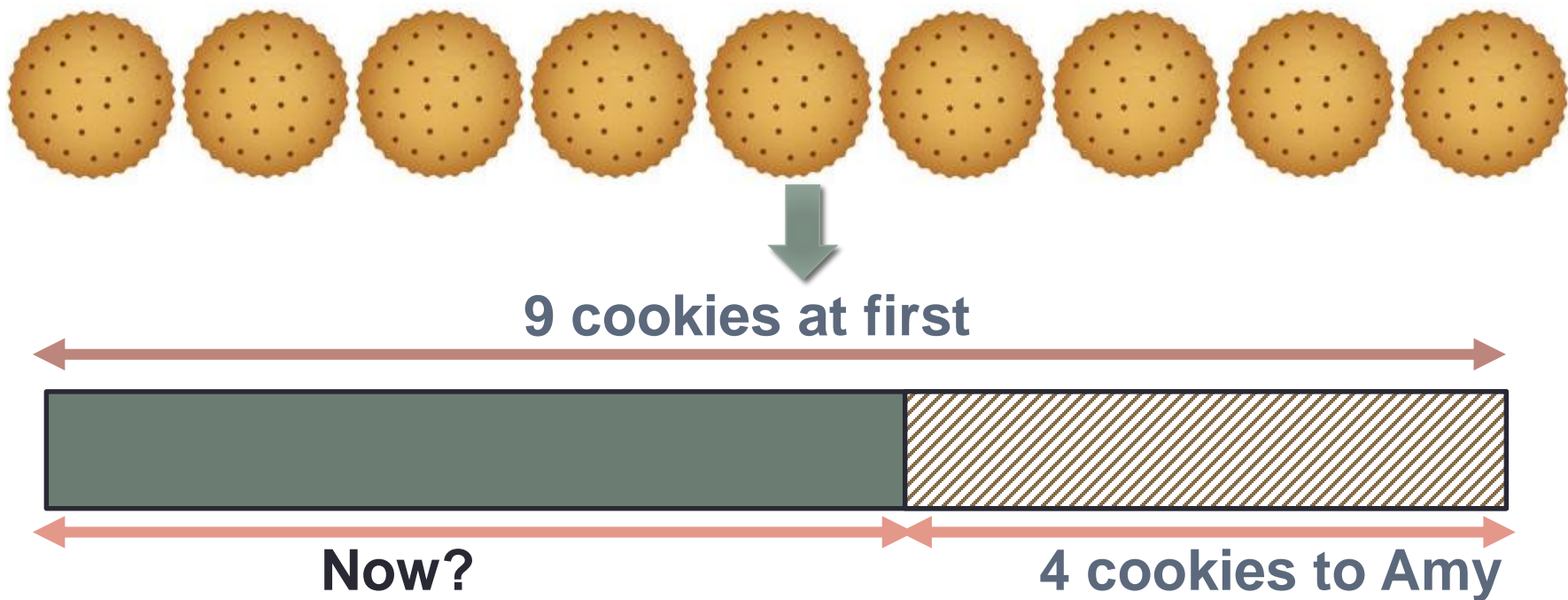
How many cookies did he give to Amy?

What do I need to find?

## Result Unknown

Peter had 9 cookies. He gave 4 cookies to Amy. How many cookies does Peter have now?

Transferring information in the question into a diagram,

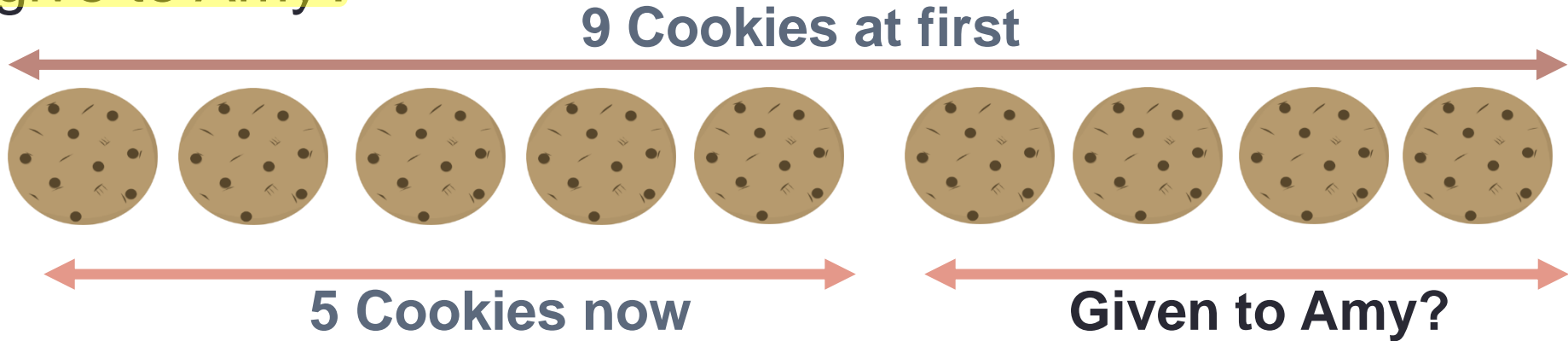


$$\begin{aligned} \text{Peter now} &= 9 - 4 \\ &= 5 \end{aligned}$$

Ans: 5

# Change Unknown

Peter had 9 cookies. He gave some cookies to Amy. Now Peter has 5 cookies. How many cookies did Peter give to Amy?



How many cookies did Peter have at first?

Who did Peter give some cookies to?

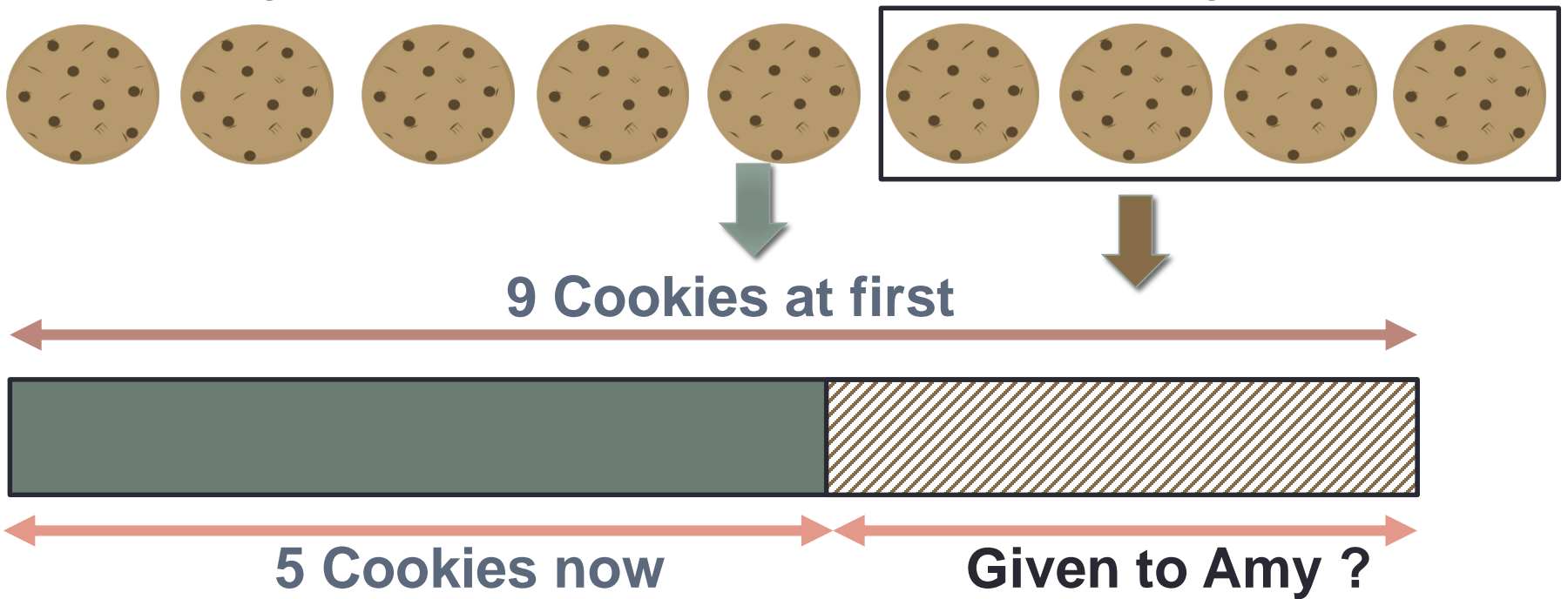
How many cookies did Peter have after he had given 5 cookies to Amy?

What do I need to find?

# Change Unknown

Peter had 9 cookies. He gave some cookies to Amy. Now Peter has 5 cookies. How many cookies did Peter give to Amy?

Transferring information in the question into a diagram,



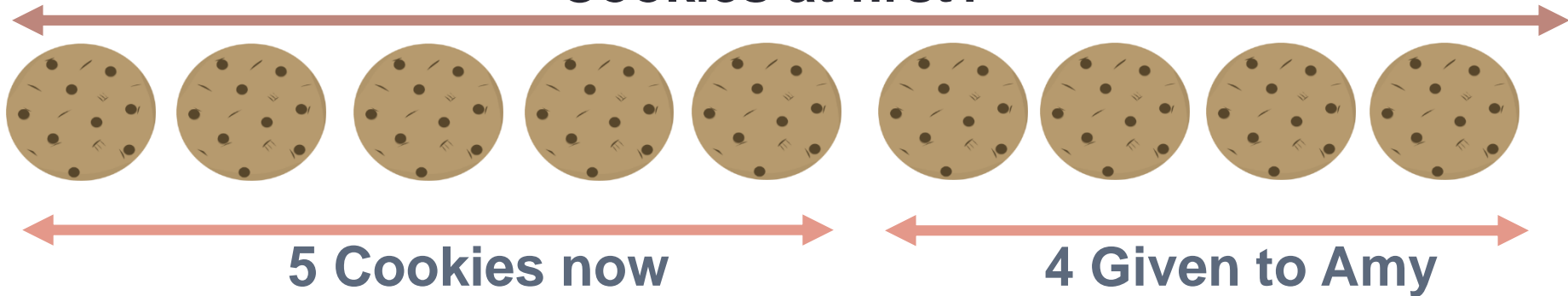
$$\begin{aligned} \text{Given to Amy} &= 9 - 5 \\ &= 4 \end{aligned}$$

Ans: 4

# Start Unknown

Peter had **some cookies**. He gave **4 cookies to Amy**.  
**Now** Peter has **5 cookies**. How many cookies did **Peter** have **at first**?

**Cookies at first?**



How many cookies did Peter have at first?

How many cookies did Peter give to Amy?

How many cookies did Peter have after giving 4 cookies to Amy?

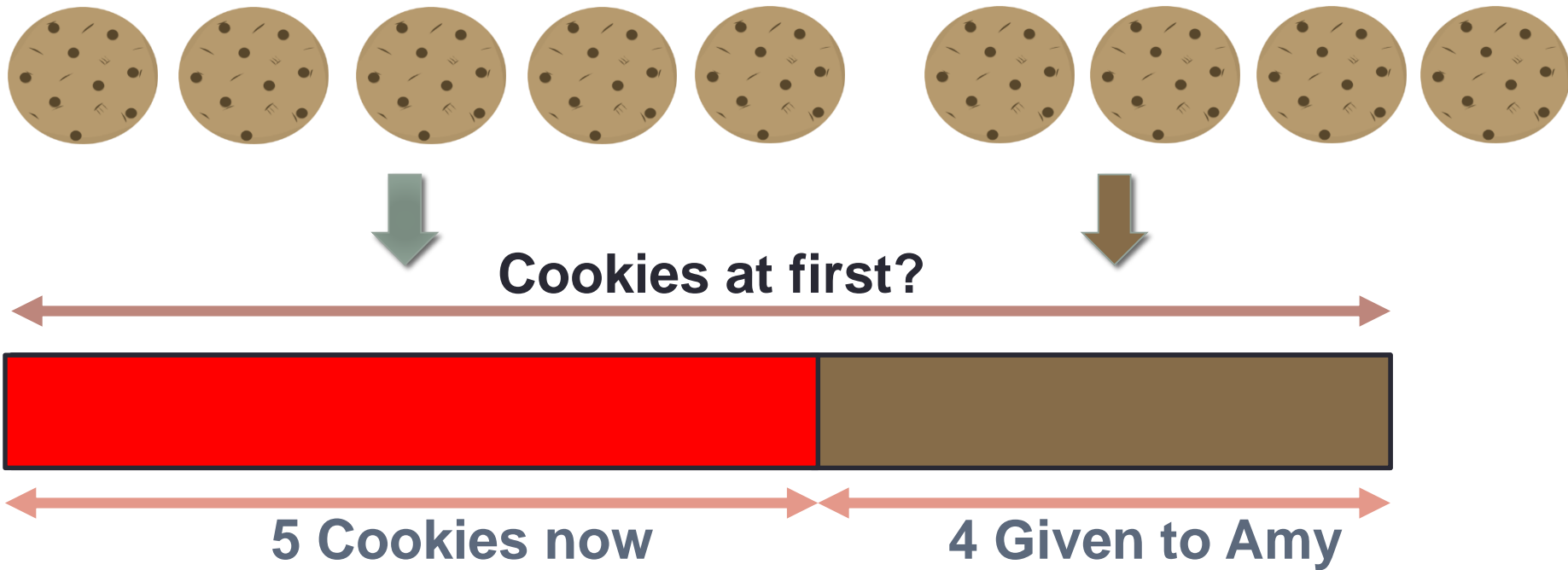
What do I need to find?



# Start Unknown

Peter had some cookies. He gave 4 cookies to Amy. Now Peter has 5 cookies. How many cookies did Peter have at first?

Transferring information in the question into a diagram,



$$\begin{aligned} \text{At First} &= 4 + 5 \\ &= 9 \end{aligned}$$

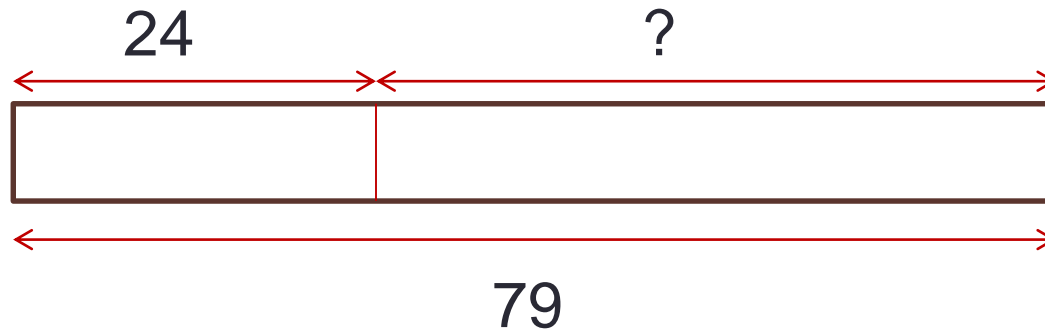
Ans: 9

# HANDS-ON ACTIVITY 2

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Peter had 79 cookies. He gave 24 cookies to Amy. How many cookies does Peter have now?

(Result Unknown)

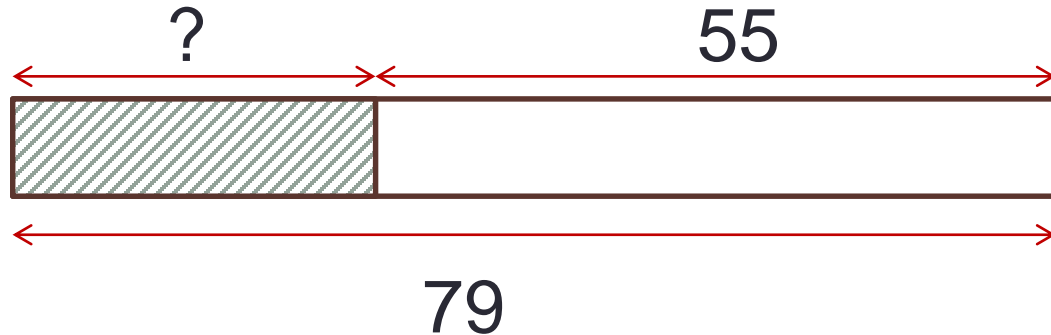


$$\begin{aligned}\text{Peter now} &= 79 - 24 \\ &= 55\end{aligned}$$

**Ans: 55**

Peter had 79 cookies. He gave some cookies to Amy. Now Peter has 55 cookies. How many cookies did Amy give Peter?

(Change Unknown)

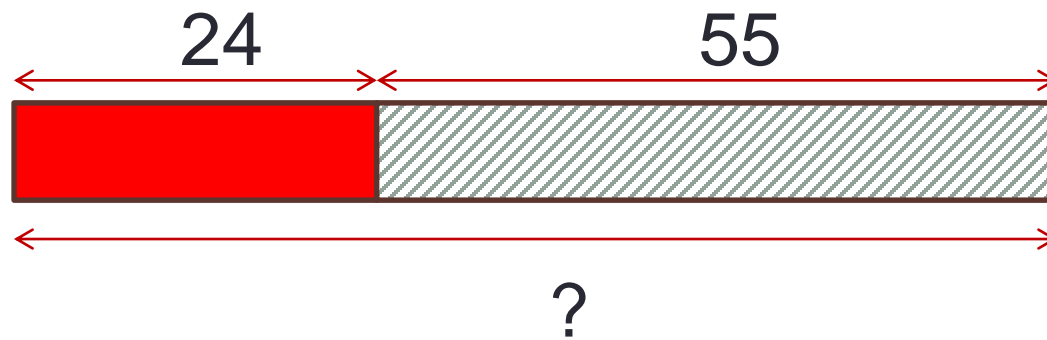


$$\begin{aligned}\text{Peter to Amy} &= 79 - 55 \\ &= 24\end{aligned}$$

**Ans: 24**

Peter had some cookies. He gave 24 cookies to Amy. Now Peter has 55 cookies. How many cookies did Peter have at first?

(Start Unknown)



$$\begin{aligned}\text{Peter at first} &= 24 + 55 \\ &= 79\end{aligned}$$

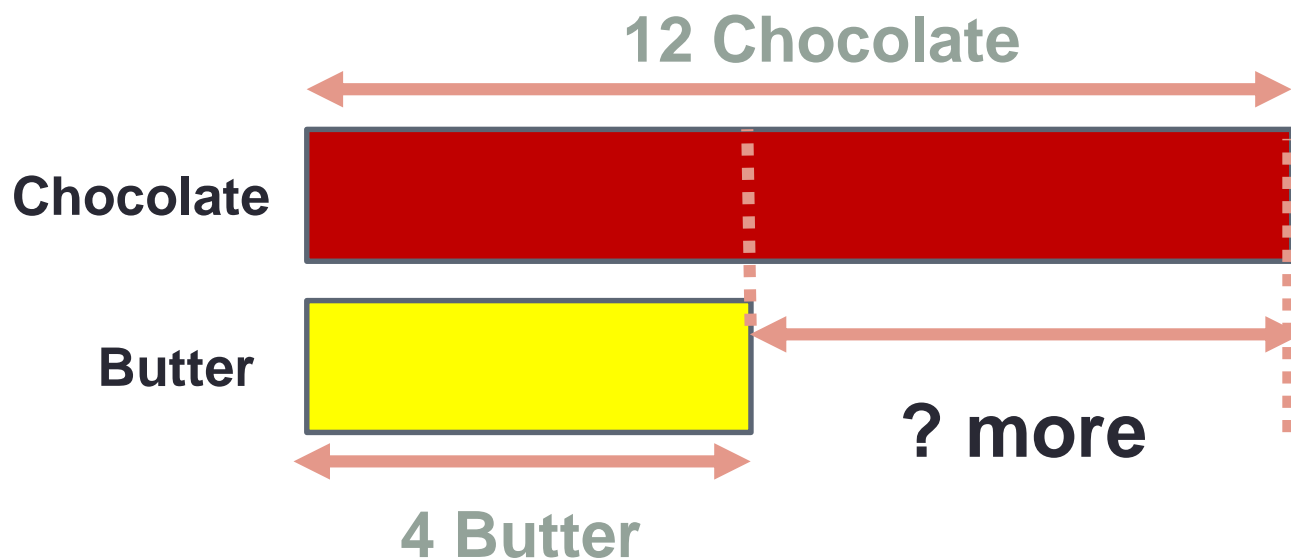
**Ans: 79**

# Comparison Problems

- There is no action in comparison problems.
- They involve comparisons at least between two different sets.

# Difference Unknown

There are 12 chocolate cookies. There are 4 butter cookies. How many more chocolate cookies than butter cookies are there?



How many chocolate cookies are there?

How many butter cookies are there?

What do I need to find?

$$\begin{aligned} \text{More} &= 12 - 4 \\ &= 8 \end{aligned}$$

Ans: 8

## More than / Fewer than

Mrs Lee baked some cookies. She baked 80 butter cookies. She baked 10 more chocolate cookies than butter cookies. How many chocolate cookies did she bake?

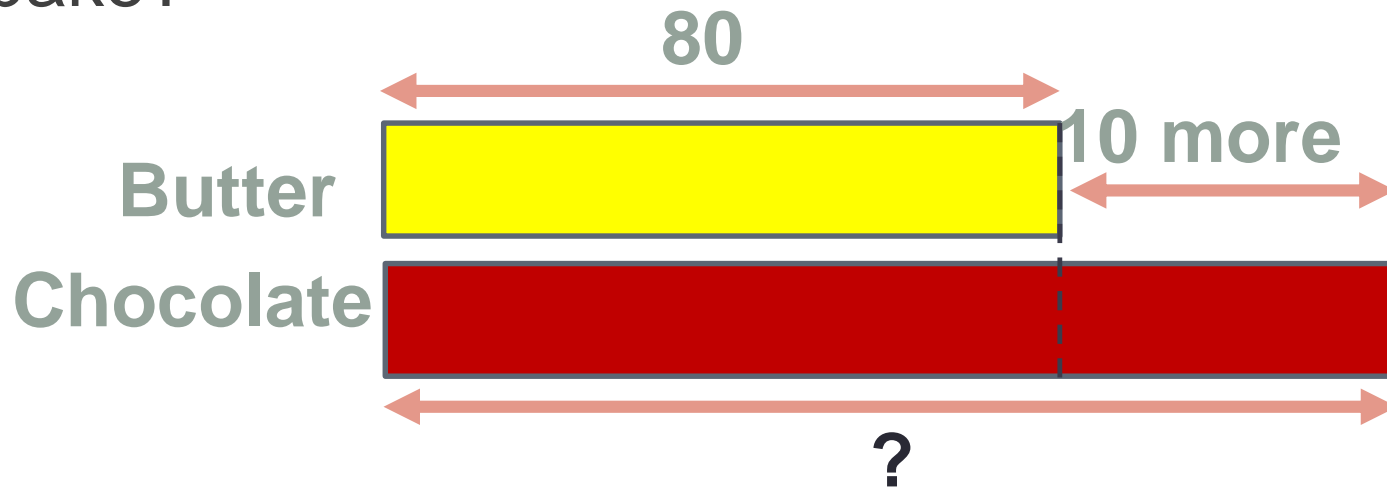
Mrs Lee baked some cookies. She baked 80 butter cookies. She baked 10 more butter cookies than chocolate cookies. How many chocolate cookies did she bake?

What is the difference between these two questions?

What is the similarity?



Mrs Lee baked some cookies. She baked 80 butter cookies. She baked 10 more chocolate cookies than butter cookies. How many chocolate cookies did she bake?



How many butter cookies did she bake?

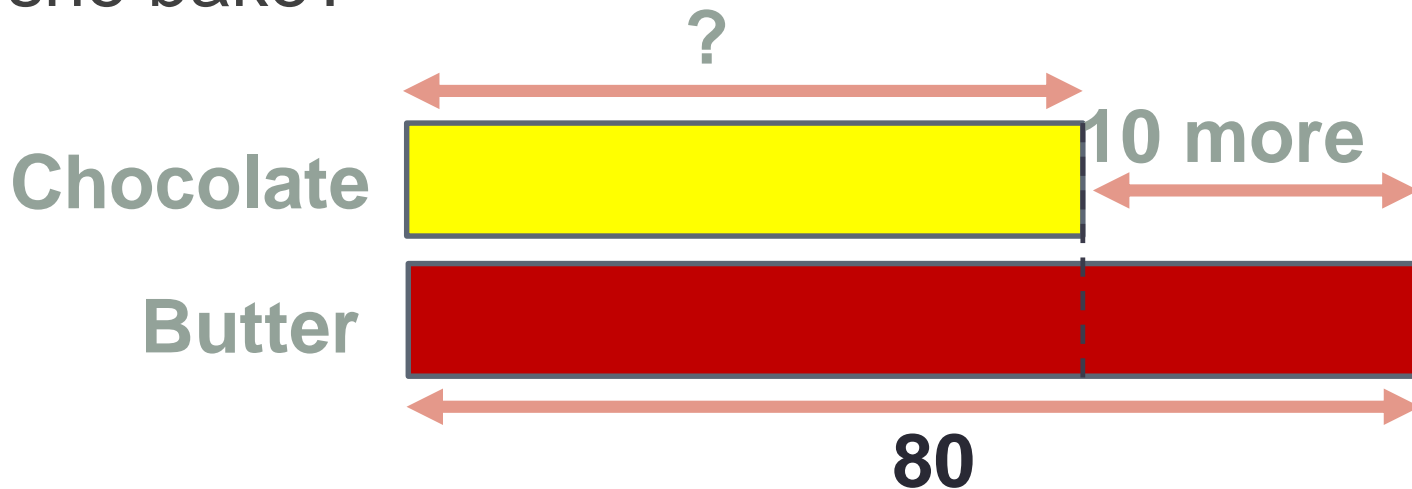
How many more chocolate cookies did she bake? Which cookie has a longer bar?

$$\begin{aligned}\text{Chocolate} &= 80 + 10 \\ &= 90\end{aligned}$$

What do I need to find?

Ans: 90

Mrs Lee baked some cookies. She baked **80 butter** cookies. She baked **10 more butter cookies** than chocolate cookies. How many **chocolate cookies** did she bake?



How many butter cookies did she bake?

How many more butter cookies did she bake? Which cookie has a longer bar?

What do I need to find?

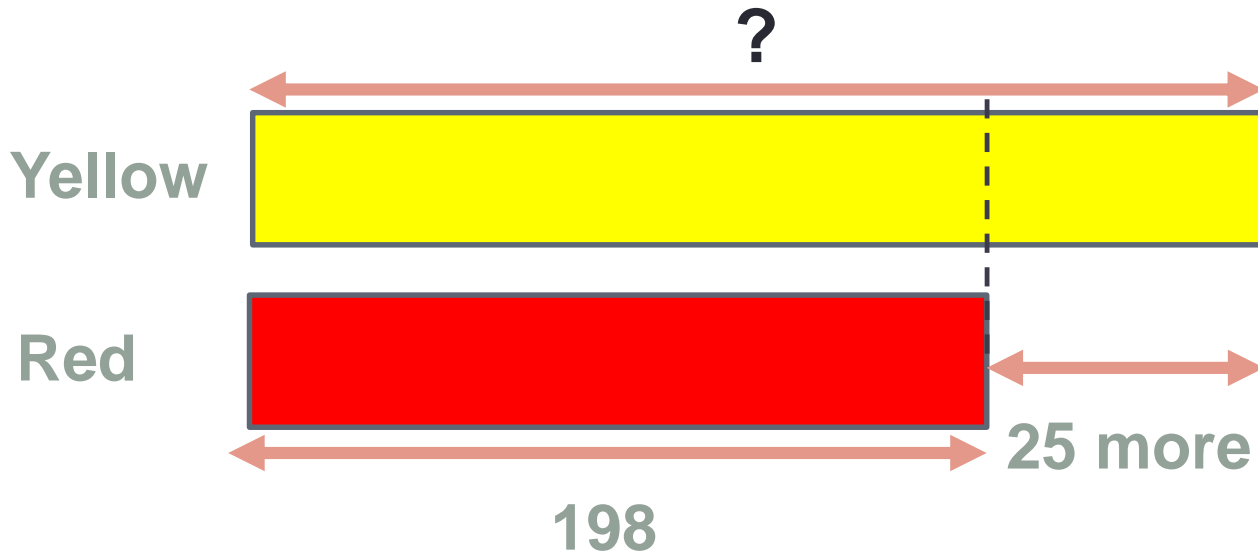
$$\begin{aligned}\text{Chocolate} &= 80 - 10 \\ &= 70\end{aligned}$$

Ans: 70

# HANDS-ON ACTIVITY 3

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Daniel has 198 red jelly beans. He has 25 more yellow jelly beans than red jelly beans. How many yellow jelly beans does he have?



$$\begin{aligned}\text{Yellow} &= 198 + 25 \\ &= 223\end{aligned}$$

Ans: 223

Daniel has 198 red jelly beans. He has 25 more red jelly beans than yellow jelly beans. How many yellow jelly beans does he have?



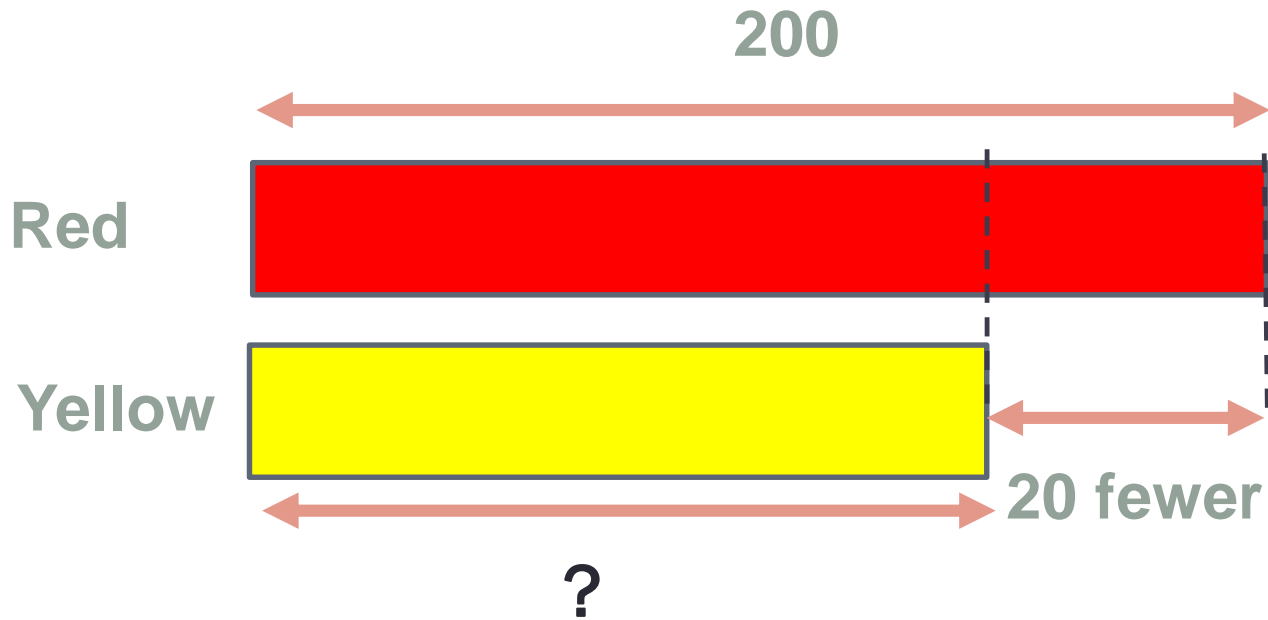
The use of the words 'more than' does not mean that you should add.

Analyse the model before deciding whether you should add or subtract.

$$\begin{aligned}\text{Yellow} &= 198 - 25 \\ &= 173\end{aligned}$$

Ans: 173

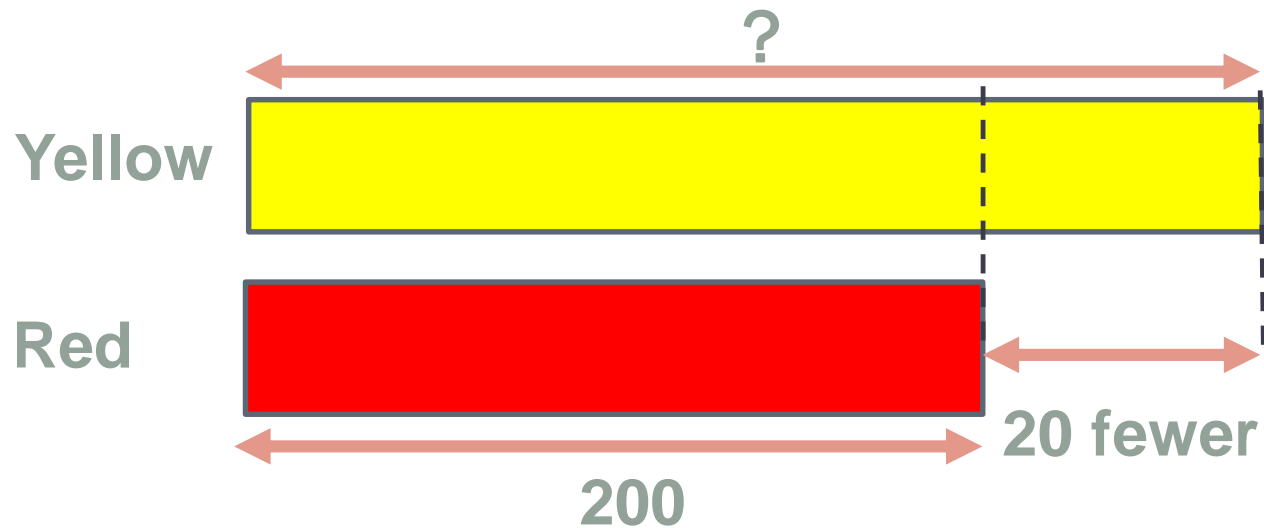
Daniel has 200 red jelly beans. He has 20 fewer yellow jelly beans than red jelly beans. How many yellow jelly beans does he have?



$$\begin{aligned}\text{Yellow} &= 200 - 20 \\ &= 180\end{aligned}$$

Ans: 180

Daniel has 200 red jelly beans. He has 20 fewer red jelly beans than yellow jelly beans. How many yellow jelly beans does he have?



The use of the words 'fewer than' does not mean that you should subtract. Analyse the model before deciding whether you should add or subtract.

$$\begin{aligned}\text{Yellow} &= 200 + 20 \\ &= 220\end{aligned}$$

Ans: 220

# THANK YOU

Q & A

