

# Subtraction using Counting On

## Overview

This activity extends the 'Counting On' method of calculating change using 'Useful Number Pairs' to apply to any subtraction, including those involving time.

Ideally it should follow the activity *Calculating Change*.

## Skills and Knowledge

Subtracting using counting on  
Subtracting using a time line (years)  
Subtracting using a time line (hours)

## Preparation and Materials

Photocopy Practice Sheets 1, 2 & 3  
(1 per student)

## Suggested Procedure

### Introducing the skill

Explain that you are going to have another look at the method that the class learned to calculate change and see how it can be used for subtractions that don't involve money.

Set the skill in context with the following scenario:

*A group of friends decide to ride 100km to raise money for charity.  
After 2 hours Alisha had ridden 28 km and she was tired.  
How much further did she have to ride?*

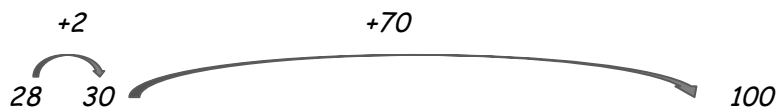
Write on the board:

28

100

Ask the following scaffolding questions and fill in the steps on the diagram as you go:

- *What's the first step we could use to count on to 100?*
- *What's the first useful number?*
- *How many km to get to 30?*
- *What's the next step we could take?*
- *How many km to get there?*
- *So what's the total distance she has to ride?*



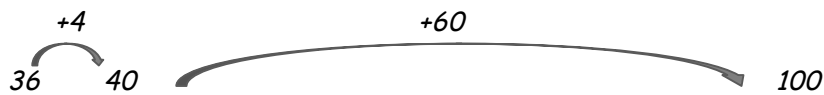
*The distance left is 2km + 70km = 72km*



Example 2: Georgia had ridden 36km when she got tired. How far did she have left to go?

Ask:

- How do we start the diagram this time?
- What number goes first?
- What's the next step?
- How many kms to get there?
- And the next step?



Total left to ride:  $4\text{km} + 60\text{km} = 64\text{ km}$

Ask students to try a couple more examples on their own before you check them on the board with the group:

- Josh had ridden 43 km when he got a flat tyre. How far does he have left to ride?
- Leanne stopped for a rest after 51 km. How much further does she have to go?

### Emphasise that this is subtraction

It is probably a good idea to remind students that what they have been doing is the same as subtraction. That way they will be more able to transfer the method to other situations.

Ask:

- Do you know how these calculations would be written if they were school 'sums'?

Explain:

- We have been finding is how far **left** to go
- That's the same as the **difference** between two distances
- Yes it is **subtraction**.

On the board:

|                    |                    |                    |                    |
|--------------------|--------------------|--------------------|--------------------|
| $100$              | $100$              | $100$              | $100$              |
| $\underline{- 28}$ | $\underline{- 36}$ | $\underline{- 43}$ | $\underline{- 51}$ |

Ask:

- Would these calculations be hard or easy as school subtraction sums?
- Which method do you find quicker - easier?

Discuss the difficulties involved in carrying or decomposing numbers when using numbers like 100, 200 etc and compare to the method they have been using.

### Checking the answers

Explain:

- We have just done four subtraction calculations
- Usually you check the answers for subtractions



- *What's the easiest way to do that?*
- *Yes its by doing the opposite – by adding*

On the board:

$$100 - 28 = 72 \qquad \text{Check: } 72 + 28 = 100 \rightarrow 72 \text{ is correct}$$

$$100 - 36 = 64 \qquad \text{Check: } 64 + 36 = 100 \rightarrow 64 \text{ is correct}$$

Ask students to check the other two calculations themselves.

### Extending beyond one hundred

To extend the method beyond a single hundred let students try a few short calculations which are designed to 'scaffold' them through the steps as the numbers get bigger.

*Examples:*

|              |              |
|--------------|--------------|
| $100 - 70$   | $100 - 58$   |
| $200 - 70$   | $200 - 58$   |
| $600 - 70$   | $700 - 58$   |
| $1,000 - 70$ | $1,000 - 58$ |
| $2,000 - 70$ | $3,000 - 58$ |

When they have had a chance to try them out, go over the steps and the process of checking to ensure their procedures make sense.

Then get students to try a few more examples without the scaffolded steps.

*For example:*

$$500 - 87 \qquad 600 - 45 \qquad 800 - 83$$

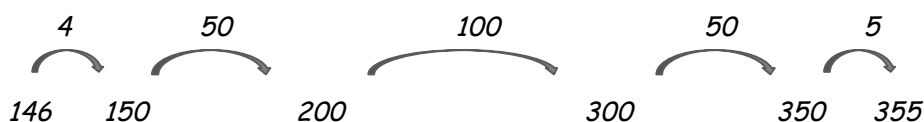
Further examples of this type are available in *Practice Sheet 1*.

### Extending to more complicated numbers

Pose the following question to the group:

- *A family has to travel 355 km to visit their relatives in another city. They stop for lunch after 146km. How much further do they have to drive?*

Ask students to tell you the steps as you build the diagram together:



*Total left to travel:*  $4 + 50 + 100 + 50 + 5 = 209 \text{ km}$



Try a few more distance scenarios until students are confident that they could do any subtraction like this.

For example:

- The total distance is 623Km they have gone 419km. How far left to go?
- The total distance is 904Km they have gone 589km. How far left to go?
- The total distance is 1,260Km they have gone 967km. How far left to go?

Further distance and other subtraction calculations are provided in *Practice Sheet 2*.

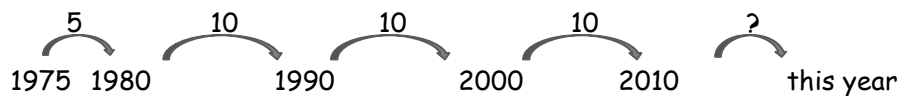
### 'Counting on' for time calculations

Counting on in combination with a time line is an ideal method for calculating time intervals.

Set the scene with the following scenario:

- The Vietnam War ended for Australian soldiers in 1975. How long ago was that?

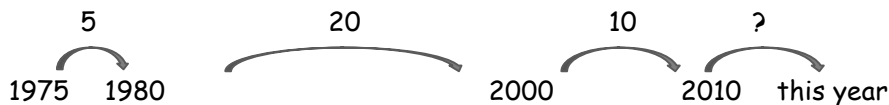
Scaffold the students with prompt questions, like those above, to draw the timeline. They may need a few more steps to help them cross the century and because the numbers are probably bigger than they are used to dealing with:



$$\text{The total time} \quad 5 + 10 + 10 + 10 + ? = 35 + ? \text{ years}$$

**Note:** the last step depends on the year in which you are doing the activity.

Student may need less supporting steps, in which case it would look like:



### A backwards example

Pose an example where the calculation would go from the current year and work back. For example:

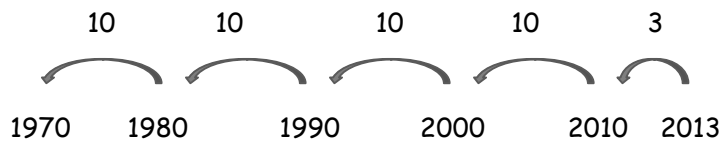
- My friend Susanna turned 43 in 2013; I want to know when she was born.

Explain and fill in the diagram as you go:

- This time we start at the current year (the other end) and draw the arrows back till we go 43 years back.
- For example, if it was 2013 the line would start there



- The first step would do the jump of 3 years back
- What year would that take us to?
- Then it is easier to go back 10 years at a time
- Stop when we have gone back 40 more years

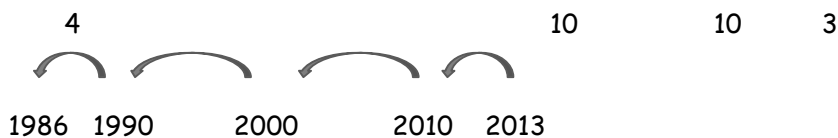


The year she was born was 1970

Together as a group go through the process of **checking** this subtraction by addition, using whichever method students are most comfortable with.

Ask: Another friend, Mary, turned 27 at the same time. When was she born?

**Note:** this time the jump from 2013 back to 2010 takes 3 years off the 7 but still leaves 4 single years to be stepped back at the end. See below.



$$1986 + 27 = 2013$$

### When were we born?

Ask students in turn to tell you how old they are now and get the other students to use the timeline counting backwards to calculate when they were born.

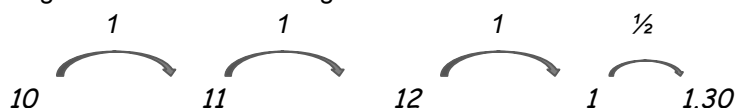
Further practice examples are provided in *Practice Sheet 3*.

### How many hours?

Explain:

- Often people who fill in time sheets at work have trouble calculating how long they worked
- For example, I worked from 10.00 AM to 1.30 PM.
- How many hours is that?

Together build the following timeline:



Hours I worked:  $1 + 1 + 1 + \frac{1}{2} = 3 \frac{1}{2}$  hours



Try a few more examples together:

- *Con worked from 9.30 AM to 2.30 PM. How many hours is that?*
- *Sammi worked from 10.45 AM to 4.15 PM. How many hours is that?*
- *Morrie worked from 9.30 AM for exactly 8 hours. What time did he finish?*
- *Jake worked from 10.15 to 2.30 how long was that?*

### **Follow up activity: How long ago was ...?**

Ask students to brainstorm some significant public events that they recall or have heard about in the past.

Write each of the events on a piece of paper and ask students to see if they can arrange the events in the order in which they happened. Stick them down on the paper as a reference.

Students should then take one event each and use the internet to find out its date. [You could do this yourself if it is not possible for the students.]

In the next class, use the dates collected to work out how many years ago each even occurred and so check whether the students' ordering was correct.



# Counting on for subtraction

## Practice Sheet 1

Use the counting on method to do these subtractions. Check your answers by adding.

1.  $100 - 36$
2.  $200 - 36$
3.  $300 - 36$
4.  $700 - 36$
5.  $1,000 - 36$

A group of friends is playing a game – they have to get 100 points to win. The table show how many points they have now. Use counting on to work out how many more each person needs.

|     | Person | Points now | Points to get 100 |
|-----|--------|------------|-------------------|
| 6.  | Ani    | 47         |                   |
| 7.  | Bev    | 26         |                   |
| 8.  | Saed   | 53         |                   |
| 9.  | Joni   | 61         |                   |
| 10. | Ahn    | 19         |                   |

Another game needs a total of 500 points to win. Use counting on to work out how many more each person needs.

|     | Person | Points now | Points to get 500 |
|-----|--------|------------|-------------------|
| 11. | Ani    | 120        |                   |
| 12. | Bev    | 248        |                   |
| 13. | Saed   | 304        |                   |
| 14. | Joni   | 115        |                   |
| 15. | Ahn    | 93         |                   |



# How much further is it?

## Practice Sheet 2

Use the Counting On method of subtraction to work out these distances.

Check all of your answers by adding.

Chen, Mani, Di and Susanna all have to drive their cars from Sydney to Melbourne along the Hume Highway.



The total distance is 881km.

1. Susanna stops for a last coffee break after 785 km. How many more kilometres does she have to drive?
2. Chen stops for the night after 450 kilometres. How far does he have to drive the next day to get to Melbourne?
3. Di has a lunch break when she has driven 562 km. How many kilometres does she still have to go?
4. Mani phones his mother after 608 km. How much further does he have to go?
5. The Hume Highway goes through Albury on the border of Victoria and NSW. It is 325 kilometres from Melbourne to Albury. How far is it from Sydney to Albury?



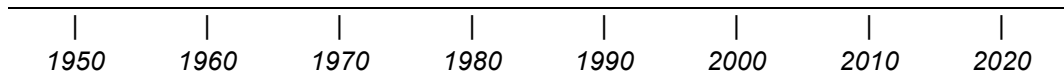


# How long ago?

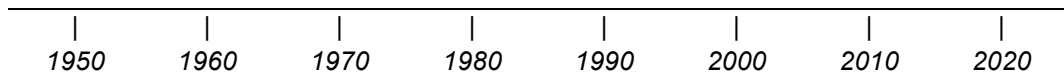
## Practice Sheet 3

Use the time lines to help answer these questions. Check your answers by adding.

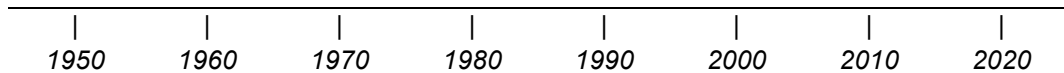
1. Australia changed to decimal currency in 1966. How many years ago was that?



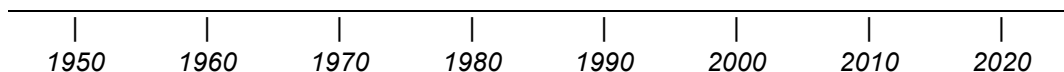
2. Melbourne hosted the Olympics in 1956. How long ago was that?



3. Bella is 29 years old this year. What year was she born?



4. Moira is 64 years old this year. What year was she born?



5. Fred was born in 1965. How old is he now?

