Calculating Change

Overview

This activity demonstrates how to use the number pairs which total 10 and 100 to perform simple, in the head change calculations.

It could be used in conjunction with *Useful Number Pairs* or as a separate follow up activity, depending on students' prior skills and knowledge.

It also describes the more general 'counting on' method for calculating change, which can be applied to a variety of situations that would otherwise use subtraction.

Skills and Knowledge

- Recall of number pairs totalling 10 & 100
- Calculation of change using number pairs
- Calculation of change by counting on

Preparation and Materials

Photocopy Practice Sheets 1 & 2 (1 per student) then cut as indicated into sets of 10 questions.

- A 10 or 6 sided dice
- At least ten 10 cent coins
- At least two 5 cent coins
- A collection of supermarket catalogues or advertisements

Suggested Procedure

Reminder of number pairs totalling 10

First revise with students the number pairs which total 10 from the last activity, but this time in the context of money, as pairs which combine to give 10 cents.

- Throw a dice (preferably 10 sided, but 6 will do).
- Call the number you have thrown as a number of cents eg 6 ce nts.

Ask

- *How many more cents would I need to add up to 10?*

Continue until students are confidently answering and all the number pairs have been revised.

Reminder of number pairs totalling 100

Write on the board:

$$30 + ? = 100$$
$$90 + ? = 100$$

Ask:
- *Write down all the other number pairs that add to 100*

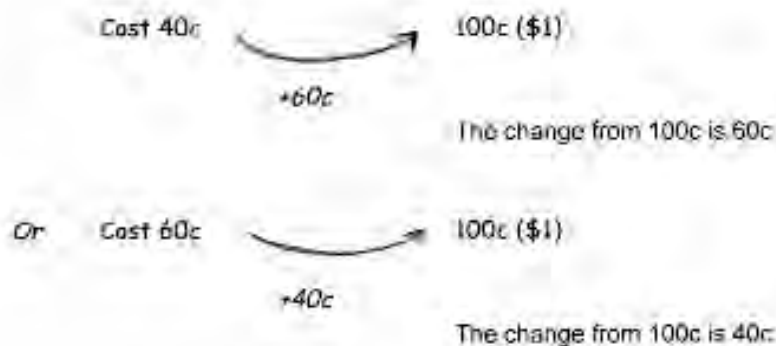List all of the pairs on the board in preparation for the next step.

Calculating change from a dollar

Point to one of the number pairs, such as 60 + 40 = 100

Ask:
- *If I buy something worth 40 cents, how much change would I get from a dollar?*
- *If I pay 60 cents for something how much change would I get?*

Representing the situation in diagram form can be more powerful than words.

Cost 40c ⟶ 100c ($1)
+60c
The change from 100c is 60c

Or Cost 60c ⟶ 100c ($1)
+40c
The change from 100c is 40c

Repeat for a few of the other number pairs.

Practice Sheet 1 contains several sets of '10 questions' relating to change calculations using these number pairs. See description of Activity: *10 questions,* for suggestions on how to use 10 question sets with your group.

Calculating change 1 – '10 question' sets   Practice Sheet 1

✂   Photocopy and cut into separate sets of 10 Questions

Set 1

For each of these, how much change would you get from $1?

1. 30c   6. 10c
2. 50c   7. 40c
3. 90c   8. 80c
4. 20c   9. 60c
5. 70c   10. 100c

Extending to change from more than $1

Ask:
- *I buy something for 35 cents*
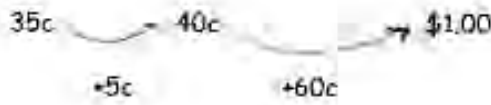- *I pay with $1.*
- *How much change do I get?*

Remind students of the pair 35c & 65c that add to 100 cents or $1. The other part of the pair is the change you get, or how much more would take it to 100 cents.

If students have remembered the number pairs ending in 5 the diagram would be:

35c ⌒ 100c

+65c

The change from 100c is 65c

If students **do not** have recall of the number pairs ending in 5 then the diagram can be broken into further steps:

35c ⌒ 40c ⌒ $1.00

+5c   +60c

The change is   5c + 60c = 65c

Ask:
- *What if I buy something worth $1.35*
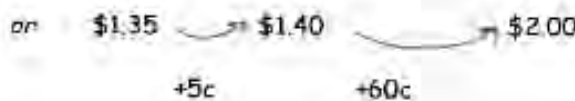- *I pay with $2*
- *How much change now?*

Assist students to see that it is almost the same situation.
We have paid the one whole dollar already then another 35 cents. The change will be how much more we need to get to the next dollar? The gap between the amounts is the same as before.

In diagram form:

$1.35 ⌒ $2.00

+65c

The change from 100c is 65c

or $1.35 ⌒ $1.40 ⌒ $2.00

+5c   +60c

The change is   5c + 60c = 65c

Try more with the 35 cents until you are sure that students have the idea of using the pair that takes you to the next dollar.

These diagrams are visual representations of the 'counting on' method for giving change that was regularly used before computerised cash registers did the thinking for the person on the till. For some students, understanding of the thinking involved in this method would be enhanced by going through the physical actions of giving change this way. Setting up a shop or market stall role play can help.

For example, ask:

- *What if I buy something worth $4.35*
- *I pay with $5*
- *How much change now?*

- *What about something worth $9.35*
- *I pay with $10*
- *How much change now?*

Extending beyond the simple number pairs

The next step involves amounts that involve extra dollars in the change.

For example:

- *What if I buy something worth $2.35*
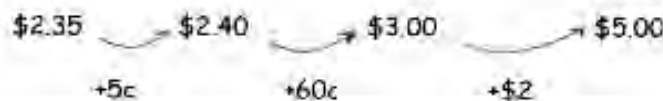- *I pay with $5*
- *How much change now?*

Encourage students to count on to the next dollar $2.35 cents and the pair 65 cents takes us to $3. Then we need $2 more to get to the $5.

If using recall of the pairs it would be represented visually by:
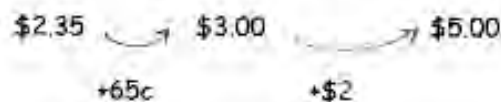
The change is 65c + $2 = $2.65

Or without recall of the pairs:

The change is   5c + 60c + $2 = $2.65

Try a few more together, for example:

- *What's the change from $5 if you spend:*
  $3.50, $2.45, $3.15, $1.85, $2.95?

Practice Sheets 2 contain sets of change calculation '10 Questions' which progress in levels of difficulty. See description of the *10 questions* Activity for suggestions on how to use these with your group.

Extension - amounts which don't end in 5

Obviously the second method described above can be used to calculate any amount of change owing. However, it is complicated by the fact that only 5 cent coins are available to give as change. For numeracy in the real world this situation should be discussed with students.

Pose a question such as the following:
- *You buy an item worth $ 2.98 what change do you expect if you pay with $10?*

The diagram would be:

$2.98 ___→ $3.00 ⌒ ─── → $10.00
+2c   +$7

The change owing would be 2c + $7 = $7.02

Ask:
- *What would happen?*
- *How much change would you get?*

Discuss this with students and look at shopping catalogue advertisements or catalogues together.

Investigate how often these kinds of prices appear.

Ask students why they think prices such as $1.99 are popular.

Discuss what happens in reality in the supermarket with small numbers of cents.

Further Practice

Distribute catalogues or leaflets to pairs of students.

Explain:
- *Select one item that you might buy*
- *Decide what coin or note you would use to pay with*
- *The work out how much change you would get.*

When individual students can calculate the change for one item easily, move them on to two or three items at a time.

Other uses of counting on

The method of 'counting on' demonstrated in this activity can be applied to calculations involving time. See the *Calculating Time* activity.

It can also be applied as an alternative method of subtraction which avoids the type of mistakes commonly made by adults who have been confused by the formal school methods.

Calculating change 1 – '10 question' sets Practice Sheet 1

✄   Photocopy and cut into separate sets of 10 Questions

Set 1

For each of these, how much change would you get from $1?

1. 30c
2. 50c
3. 90c
4. 20c
5. 70c

6. 10c
7. 40c
8. 80c
9. 60c
10. 100c

Set 2

For each of these, how much change would you get from $1?

1. 60c
2. 30c
3. 50c
4. 80c
5. 70c

6. 20c
7. 60c
8. 100c
9. 10c
10. 90c

Set 3

For each of these, how much change would you get from $1?

1. 95c
2. 55c
3. 15c
4. 75c
5. 35c

6. 65c
7. 45c
8. 5c
9. 85c
10. 25c

Calculating change 1 – '10 question' sets

✂ Photocopy and cut into separate sets of 10 Questions

Set 4

For each of these, how much change would you get from $2?

1.	$1.50	6.	$1.20
2.	$1.85	7.	$1.35
3.	$1.65	8.	85 cents
4.	90 cents	9.	$1.95
5.	$1.05	10.	55 cents

Set 5

For each of these, how much change would you get from $5?

1.	$3.50	6.	$1.35
2.	$4.75	7.	$2.90
3.	$1.50	8.	$4.10
4.	$2.25	9.	$2.50
5.	$4.40	10.	$1.10

Set 6

For each of these, how much change would you get from $10?

1.	$4.50	6.	$8.30
2.	$9.25	7.	$2.50
3.	$7.50	8.	$4.90
4.	$5.70	9.	$7.25
5.	$4.60	10.	$6.35

✂ Photocopy and cut into separate sets of Mixed10 Questions

Mixed Set 1

1. What is the change from $1 if you spend 35c?

2. You have $3.15. How much more do you need to make $4?

3. $1.55 + 45c = …………

4. What is the change from $5 if you spend $3.40?

5. You want $20 but only have $19.75. How much more do you need?

6. $100 is needed but you only have $65. How much more do you need?

7. 45 c and 55c equals …………

8. You spend $1.25 then 75 cents. How much do you spend altogether?

9. You buy a cake for $2.35 and pay with $5. How much change will you get?

10. The total of $3.65 and $1.35 is …………

Mixed Set 2

11. What is the change from $2 if you spend $1.45c?

12. You have $2.15. How much more do you need to make $3?

13. $1.65 + 35c = …………

14. What is the change from $10 if you spend $8.30?

15. You want $10 but only have $9.25. How much more do you need?

16. $100 is needed but you only have $65. How much more do you need?

17. 85c and 15c equals …………

18. You spend $4.75 then 25 cents. How much do you spend altogether?

19. You buy a cake for $1.95 and pay with $5. How much change ?

20. The total of $2.35 and $2.65 is …………