Shortcut percentages

The 'per 100' method

Overview

This activity uses the concept of a percentage rise in wages or allowances to present a **shortcut** or **'in the head'** method for calculating percentages.

Two versions of the method are introduced to cater for different levels of student ability. Both are based on understanding percentage as **'per hundred'** or **'in every hundred'**.

Ideally this activity follows *Percentages of our lives* which explores this meaning of percentage.

The activity focuses on calculating percentages of multiples of $100, such as $200, $300, $500 and amounts such as, $50, $150, $450 etc. However, it can be extended to estimating percentages for other amounts by first approximating to the nearest 50.

Skills and Knowledge

- Concept of percentage as 'per100'
- Using the 'per 100' method to calculate percentages
- Estimate percentages using the 'per 100' method

Preparation and Materials

Photocopy Practice Sheets:
Increasing Incomes 1 & 2 (1 per student)

Suggested Procedure

Introducing the activity

Note: If you are following directly from the *Percentages of our Lives* Activity the introduction will be more of a revision.

Ask students to discuss in pairs:

- *What does the word 'percent' mean?*
- *For example, what would it mean to get a 4% rise in pay or a weekly allowance?*

Discuss various responses as a whole class and if necessary assist students to arrive at the meaning of 'per hundred' or 'in every hundred'.

In the particular example, it would mean:

$4 extra for every $100 you get now

Two versions of the calculation method are described below. One is simpler to understand but can take longer to calculate, the other is shorter but may be more complex for some learners to understand at first. Choose the version you think will best suit you students or perhaps introduce the first, which for some students will lead easily into the second.

4% of $300 Version 1

First draw a table on the board as shown filling it in line by line as students answer questions such as:

- *If someone gets exactly $100 per week now, what would their rise be?*
- *If they get another $100 per week, what extra would that give them?*
- *And another $100 per week would give them an extra ... ?*
- *What is the total for each column?*

Wage	Rise
$100	$4
$100	$4
$100	$4
Total $300	$12

4% of $300 Version 2

Ask:

- *If someone gets $100 per week now, what would their rise be?*
- *If they get $200 per week now, what would the rise be?*
- *If they get $300 per week now, what would the rise be?*
- *If a supervisor gets $700 per week now, what would their rise be?*

As students answer, record on the board:

$100 ➔ $4 rise
$200 = (2 x $4) ➔ $4
$300 = (3 x $4) ➔ $4
$700 = (? X $4) ➔ $?

If students are not yet able to tell you that the last rise would be 7x $4 or $28 then try a few more examples together until they can see a pattern and the logic behind it.

Ask:

- *Can you explain the pattern or rule in your own words?*

You are looking for responses something like 'for every $100 you get $4 extra, so you have to multiply $4 by the number of hundreds.'

Further examples

Ask students to use whichever method they prefer to:
Calculate a 4% increase on incomes of:

- *$500 per week*
- *$700 per week*

4% of $50 **Both versions**

Now ask:

- *If a part timer gets $50 per week what would their 4% rise be?*
  [Since $50 is exactly half of $100, then the rise will be exactly half of $4 = $2]

- *What about $350?*

Version 1

Wage	Rise
$100	$4
$100	$4
$100	$4
$ 50	$2
Total $300	$12

Version 2

$300 ➔ 3 x $4 = $12
$50 ➔ $2
$350 ➔ $12 + $2= $14

Further examples

Calculate a 4% increase on incomes of:

- *$250*
- *$650*

[Answers: $8 + $2 = $10; $24 + $2 = $26]

Extending to other percentages

Now try some examples with a different percentage increases, for example:
Calculate a 2% 'cost of living' increase for wages or allowances of:

- *$200 per week*
- *$700 per week*
- *$450 per week*

Try a few different examples until learners seem confident to use either version 1 or 2 of this method.

Calculating the new total

Now return to the first example and ask:

- *This first person had a wage of $300 per week.*
- *They will get a 4% rise of $12.*
- *So what is their wage after the rise?*

[Answer $312]

Ensure students understand to add the extra on to the original

Ask students to repeat this calculation for each of the examples they have done already.

Further practice is available in Practice Sheet 1.

This method is applied to smaller amounts of money in the Activity: *Shortcut Percentages: Cents in the dollar.*

Extension - Estimating percentage increases

The next step is to extend this method to **estimations** of percentages when the amount is not an exact multiple of 50 or 100.

Explain:

- *This method is easy with numbers like 200, 300, 450, etc because they are exact*
- *Sometimes the amounts of money are not so neat*
- *But we can use the same method to **estimate** the increase*

Emphasise:

- *We don't always need to know the **exact** amount to know what an increase will mean for our lives.*

Ask learners to discuss in pairs:

- *How could you estimate a 4% rise on an allowance of $280?*

Use students' responses to discuss:

Step 1 — $280 is close to $300.

Step 2 — Calculate 4% as before
[3 lots of $4 = $12]

Result — The **approximate rise** is $12,
Or we could say 'The rise is **almost** $12'

So the final allowance is **approximately** $280 + $12 = **$292**

Further examples

Try a few more together. For example:

Estimate a 2% increase on: $420; $391; $219 and $263
[Answers: $8; $8; $4; $5]

Make sure that:
- *$219 is approximated by $200 not $220 (which can't be calculated easily using this method)*
- *$263 is approximated by $250 not $300 (it is closer to $250 so this will give a more accurate estimate)*

Further examples:

Estimate a 3% 'cost of living' increase on: $323, $439, $408 and $479
[Answers: $9; $13.50; $12; $15]

Further practice for students is available in Practice Sheet 2.

Other ideas

Scan newspapers for articles relating to cost of living increases, workers' claims for higher salaries, or cuts to services or allowances. Create some related case studies (e.g. a person on the current base rate salary) and get students to estimate the meaning in real terms for a week, for a month, for a year. What might this amount of money buy?

You could integrate this topic with other subjects or units of study. Encourage students to research the relevant wage information on Internet sites that provide award wages and conditions. They could also write, or give an oral presentation, about their findings.

Increasing Incomes

Practice Sheet: 1

Some typical weekly incomes in Australia are listed here.
Calculate a 2% 'cost of living' increase for each of them.

1.	Part-time cleaner	$600	2% increase:	$ ……
2.	Car mechanic	$1,400	2% increase:	$ ……
3.	Electrician	$2,700	2% increase:	$ ……
4.	Unemployment benefit	$250	2% increase:	$ ……

Sarah gets a disability support allowance of about $550 a fortnight.

5. If it is increased by 1%, how much extra would she get? $ ……

6. What would the fortnightly payment become? $ ……

7. If it was increased by 3% what would the payment become?

$ ……

Increasing Incomes

Practice Sheet: 2

Estimate the increases of all of these:

1. Sarah, a full-time cleaner earns $961 per week.

   If wages rise by 1%, her approximate rise = $ …….

2. Tibor, a car mechanic, earns $1346 per week.

   If wages rise by 3%, he will get approximately $ …… more each week.

Alisha works half time as a painter.
Each week she gets a salary of $788,

3. If her salary increases by 4% about how much more will she get? ……

4. What will her salary be after the increase? ……..

5. Simone, an accountant, is paid $2,115 a week.
   He pays 9% in expenses every week.

   Approximately how much are his expenses? …….

6. Tran is a carpenter. His weekly wage is $1538.
   He gets a bonus of 7% for the week of Tet (New Year week).

   About how much will this be? …….