

Innovating with the Multimodalities-Entextualization Cycle in Language Across the Curriculum (LAC) to Improve ESL Junior Secondary Students' English Literacy

Materials tried out in teachers' lessons:

Percentage: An LAC Collaboration [Teacher Version]

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The lesson materials tried out represented an LAC collaboration between
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Unit Overview

Percentage

| Module | Percentage |
|---------------------|--|
| Target Class Level | Form 1 |
| Learning Objectives | <p>Previous Knowledge: Students have already mastered the concepts of percentage and percentage change</p> <p>Content learning objectives: At the end of the module, students will be able to:</p> <ol style="list-style-type: none"> 1) Understand the concepts of selling price/marked price/cost price, profit/loss, and discount/discount per cent. 2) Solve problems involving profit and loss and discount. <p>Language learning objectives: At the end of the module, students will:</p> <ol style="list-style-type: none"> 1) Understand the following language to solve problems involving profit/loss and discount: <p><i>Selling price, marked price, cost price, profit, loss, discount, \ Discount per cent, respectively</i></p> <p><i>[A] sells [B] for/at [a number] [A] is sold at/for [a number] At a profit/loss of [%] suffer a loss of [%] A discount of [%] [%] off</i></p> |

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Part 1 Profit and Loss

Lead-in Activity

Listen to a [song](#) about percentage and fill in the blanks below:



1. **Percent** in Latin means a part of 100.
- 2.

| Percentages | Fractions | Decimals |
|---------------------|--------------------|--------------------|
| 1% = | 1/100 = | 0.01 |
| (In Chinese) 百分數 | (In Chinese) 分數 | (In Chinese) 小數 |

Task 1 Language used for problems involving profit and loss

When solving problems involving profit and loss, it's important to understand the relationship among 1) profit/loss, 2) selling price 售價 and 3) cost price 成本. When you identify any two of them in the question, you will be able to obtain the one left by using the formulas below.

| Profit (利潤) | Loss (虧損) |
|--|--|
| $\text{Profit} = \text{selling price} - \text{cost price}$ | $\text{Loss} = \text{cost price} - \text{selling price}$ |
| $\text{Profit\%} = (\text{profit} / \text{cost price}) * 100\%$ | $\text{Loss\%} = (\text{loss} / \text{cost price}) * 100\%$ |
| $\text{Profit} = \text{cost price} * \text{profit\%}$ | $\text{Loss} = \text{cost price} * \text{loss\%}$ |
| $\text{Selling price} = \text{cost price} * (1 + \text{profit\%})$ | $\text{Selling price} = \text{cost price} * (1 - \text{loss\%})$ |

Let's see how questions involving profit and loss are typically formed.

Read the questions.

- 1) Identify the known and the unknown, and underline the signal words
- 2) Choose the formula to be used
- 3) Write the solution:

| Questions | The known | | The unknown | Formula used | Solution |
|--|-----------------------|-------------------------|---|---|--|
| Ken <u>buys</u> a TV game set <u>for</u> \$4800 and <u>sells</u> it <u>at</u> \$6000 later. <u>Find</u> the profit per cent. | Cost price = \$4800 | Selling price = \$ 6000 | Profit Profit% | Profit = Selling price - cost price Profit% = (profit / cost price) * 100% | \$ (6000 - 4800) / 4800 = 25% |
| Signal words | Buys ... for ... | Sells ... at ... | Find the ... | | |
| The <u>cost price</u> of a necklace is \$2500 and it is sold at <u>a profit of</u> 55%. (a) <u>Find</u> the profit. (b) <u>Find</u> the selling price of the necklace. | Cost price = \$2500 | Profit % = 55% | Profit Selling price of the necklace | a) Profit = cost price * profit% b) Selling price = cost price * (1 + profit%) | a) \$2500 * 55% = \$1375 b) \$2500 * (1+55%) = \$3875 |
| Signal words | The cost price of ... | A profit of ... | Find ... | | |
| Miss Wong bought a gold cube last month. She <u>sells</u> the gold cube now <u>for</u> \$8280 and <u>suffers a loss of</u> 8%. <u>Find</u> the loss. | Selling price = 8280 | Loss% = 8% | Cost price Loss | Selling price = cost price * (1 - loss%) Loss = cost price * loss% | Let the cost price of the gold cube be X. X(1-8%) = 8280, X = \$9000 Loss: \$9000 * 8% = \$720 |
| Signal words | Sell for ... | Suffers a loss of ... | Find | | |

| Language Support 1 - talking about profit and loss | | | |
|--|---|--------------------|-----------------------|
| Talking about ... | | | |
| Cost price | Selling price | Profit % | Loss % |
| Buys for ... Bought for ... Is bought for ... The cost price of ... is ... | Sells at ... Is sold at ... The selling price of ... is ... | At a profit of ... | Suffers a loss of ... |

Task 2 Solve problems involving profit and loss by filling in the table

Read the questions.

Identify the known and the unknown, and underline the signal words

Choose the formula to be used

Write the solution

| Questions | The known | The unknown | Formula used | Solution |
|--|------------------------|--|--|---|
| <u>The cost price</u> of a watermelon is \$40. It is sold at <u>a profit of</u> 15%. (a) <u>How much</u> is the profit? (b) <u>Find</u> the selling price of the watermelon. | Cost price = \$40 | Profit% = 15% Profit Selling price | Profit = cost price * profit% Selling price = Cost price + Profit | a) $\$40 * 15\% = \6 b) $\$(40+6) = \46 |
| A shop <u>sells</u> a refrigerator at \$5700, with <u>a profit of</u> 14%. (a) <u>Find</u> the cost price. | Selling price = \$5700 | profit % = 14% | Cost price Selling price = cost price * (1+profit%) | Let the cost price of the refrigerator be x. $x (1+14\%) = 5700, x = \$5000$ |
| (b) <u>Find</u> the new selling price if the <u>profit per cent</u> is decreased to 12%. | Cost price = \$5000 | Profit % = 12% | Selling price Selling price = cost price * (1 + profit %) | $\$5000 * (1+12\%) = \5600 |
| Mrs Chan bought a diamond ring last year. She | Selling price = \$ | Loss % = 20% | Loss Selling price = cost price * (1 - loss %) | Let the cost price of the |

| | | | | | |
|--|---|----------------------------------|---|--|---|
| <u>sells</u> her ring now <u>for</u> \$24000 and she suffers a loss of 20%. <u>How much is the loss?</u> | 24000 | | Cost price | - loss %) Loss = cost price * loss% | diamond ring be X. $X(1-20\%) = \$24000, X = \30000 Loss = \$30000 * 20% = \$6000 |
| Nancy <u>bought</u> a gold coin <u>for</u> \$8080. After one month, she <u>sold</u> the gold coin to her friend Daniel at a <u>loss of</u> 10%. Daniel then <u>sold</u> the gold coin for \$7230. He claimed that he suffered a loss. Do you agree? Explain your answer. | Nancy's cost price = \$ 8080 | Nancy's loss% = 10% | Nancy's selling price | Selling price = cost price * (1-Loss %) | \$8080*(1-10%) = \$7272 |
| | Daniel's cost price = Nancy's selling price = \$ 7230 | Daniel's selling price = \$ 7230 | Is the selling price smaller than the cost price? | Compare the selling price and the cost price | 7272 > 7230, so he suffered a loss. |

Task 3 Create questions according to the solutions

You are given the solutions. Now create questions that can be solved by the given solutions. One example has been done for you.

| Solution | Different parts of the solution | | | Question |
|--------------------------------|---------------------------------|----------------------------------|---------------------------------|---|
| \$ (4200+800) = \$ X, X = 5000 | The known | | The unknown | Ada bought a watch for \$ 4200. She earns \$800 by selling it. Find the selling price of the watch. |
| | The cost price = \$ 4200 | Profit = \$800 | The selling price = \$ 5000 | |
| Signal words | Buys ... for Bought .. for | At a profit of Earns ... | The selling price of ... is ... | |

| | | | | |
|--|--|--|--|--------------------|
| \$ 3600 - X = \$ 1800; X = \$ 1800 (1800/3600)* 100% = 50% | | | | (student's answer) |
| Signal words | | | | |
| X (1-20%) = \$400; X = \$500 | | | | (student's answer) |
| Signal words | | | | |
| \$120 * (1+X %) = \$ 192, X = 60% | | | | (student's answer) |
| Signal words | | | | |

Part 2 Discount

Task 4 Language used for problems involving discount

When solving problems involving profit and loss, it's important to understand the relationship among 1) discount, 2) marked price 標價 and 3) selling price 售價. When you identify any two of them in the question, you will be able to obtain the one left by using the formulas below.

| |
|---|
| Discount = Marked price - selling price |
| Discount % = (discount / marked price) * 100% |
| Discount = marked price * discount % |
| Selling price = marked price * (1 - discount %) |

Let's see how questions involving profit and loss are typically formed.

Read the questions.

- 1) Identify the known and the unknown, and underline the signal words
- 2) Choose the formula to be used
- 3) Write the solution

| Questions | The known | | The unknown | Formula used | Solution |
|--|----------------------------|------------------------|---------------|--|---|
| A department store offers a <u>30% discount</u> to customers for all items. If a school bag is <u>sold at</u> \$455, <u>find</u> its marked price. | Discount % = 30% | Selling price = \$ 455 | Marked price | Selling price = marked price * (1 - discount %) | Let the marked price of the bag be X. $X(1-30\%) = \$455, X = \650 |
| Signal words | ...discount | Sold at ... | Find ... | | |
| The <u>marked price</u> of a dining table is \$1300. If it is <u>sold at</u> \$936, <u>find</u> the discount percent. | Marked price = \$ 1300 | Selling price = \$936 | Discount % | Discount % = (discount / marked price) * 100% Discount = Marked price - selling price | $[(1300-936) / 1300] * 100\% = 28\%$ |
| Signal words | Marked price of ... | Sold at ... | Find ... | | |
| The <u>marked price</u> of a guitar is \$3400, and it is sold at <u>10% off</u> . a) <u>Find</u> the selling price of the guitar | Marked price = \$3400 | Discount % = 10% | Selling price | Selling price = marked price * (1 - discount %) | $3400 * (1-10\%) = \$3060$ |
| Signal words | Marked price of ... is ... | Sold at ... off | Find | | |
| b) If the <u>cost price</u> of the guitar is \$2000, <u>find</u> the profit per cent. | Cost price = \$2000 | Selling price = \$3060 | Profit % | Profit % = [(selling price - cost price) / cost price] * 100 % | $[(3060-2000) / 2000] * 100\% = 53\%$ |

| | | | | | |
|--------------|--------------------------|------------------|------|--|--|
| Signal words | Cost price of ... is ... | From question a) | Find | | |
|--------------|--------------------------|------------------|------|--|--|

| Language Support 2 - talking about discount | | |
|---|---|------------|
| Talking about ... | | |
| marked price | Selling price | Discount % |
| The marked price of ... is ... | Is sold at ... The selling price of ... is ... | % off |

Task 5 Solve problems involving discount by filling in the table

Read the questions.

Identify the known and the unknown, and underline the signal words

Choose the formula to be used

Write the solution

| Questions | The known | The unknown | Formula used | Solution |
|---|---|-------------|--|---|
| The <u>marked price</u> of a notebook is \$28. If it is <u>sold at</u> \$24.5, find the discount per cent. | Marked price = \$28 Selling price = \$24.5 | Discount % | Discount = Marked price - selling price Discount % = (discount / marked price) * 100% | $\begin{aligned} \text{Discount} &= \$28 - \$24.5 \\ &= \$3.5 \\ \text{Discount \%} &= (\$3.5 / \$28) * 100\% \\ &= 12.5\% \end{aligned}$ |
| In a restaurant, the <u>marked price</u> and the <u>selling price</u> of lunch set A are \$45 and \$36 <u>respectively</u> (分別是). | Marked price = \$45 Selling price = \$36 | Discount % | Discount = Marked price - selling price Discount % = (discount / marked price) * 100% | $\begin{aligned} \text{Profit for A:} \\ \text{Discount} &= \$45 - \$36 \\ &= \$9 \\ \text{Profit \% for A:} \\ &= (\$9 / \$45) * 100\% \\ &= 20\% \end{aligned}$ |
| The <u>marked price</u> and the <u>selling price</u> of lunch set B are \$80 and \$68 | Marked price = \$80 Selling price = \$68 | Discount % | Discount = Marked price - selling price | $\begin{aligned} \text{Profit for B:} \\ \text{Discount} &= \$80 - \$68 \\ &= \$12 \\ \text{Profit \% for B:} \\ &= (\$12 / \$80) * 100\% \\ &= 15\% \end{aligned}$ |

| | | | | | |
|---|----------------------|------------------------|---------------|--|--|
| <u>respectively</u> . Which lunch set is sold at a larger <u>discount per cent</u> ? | | | | $\text{Discount \%} = (\text{discount} / \text{marked price})$ | $\$(12/80) * 100\% = 15\%$ A's profit \% > B's profit % |
| The <u>marked price</u> of a smartphone case is \$108, and it is sold at <u>30% off</u> . (a) Find the selling price of the smartphone case. | Marked price = \$108 | Discount \% = 30% | Selling price | $\text{Selling price} = \text{marked price} * (1 - \text{discount \%})$ | \$ 108 * (1-30%) = \$75.6 |
| (b) If the <u>cost price</u> of the smartphone case is \$54, find the profit per cent. | Cost price = \$54 | Selling price = \$75.6 | Profit % | $\text{Profit} = \text{Selling price} - \text{cost price}$ $\text{Profit \%} = (\text{profit} / \text{cost price}) * 100\%$ | $\$ [(75.6-54) / 54] * 100\% = 40\%$ |

Task 6 Create questions according to the solutions

You are given the solutions. Now create questions that can be solved by the given solutions. One example has been done for you.

| Solution | Different parts of the solution | | | Question |
|---------------------------------------|---------------------------------|------------------------|-------------------|---|
| $\$3400 * (1 - x\%) = \$3060, x = 10$ | The known | | The unknown | The marked price of a mattress is \$3400; it is now sold at \$3060. Find the discount per cent of the mattress. |
| | marked price = \$3400 | Selling price = \$3060 | Discount % | |
| Signal words | The marked price of ... is ... | Sold at ... | Discount per cent | |
| $X (1-30\%) = \$420,$ $X = \$600$ | | | | (student's answer) |
| Signal words | | | | |

| | | | | |
|-------------------------------------|--|--|--|--------------------|
| \$500 * (1-16%) = \$X, X = \$420 | | | | (student's answer) |
| Signal words | | | | |
| \$650 * (1-x %) = \$455, x=30 | | | | (student's answer) |
| Signal words | | | | |

Part 3: My vocabulary bank and learning record

In this part, you will revise the topic vocabulary and assess your learning.

Task 7. My Vocabulary Bank

| Algebraic equations in one unknown | | |
|------------------------------------|---|--|
| Subject-specific vocabulary | General academic vocabulary | Linking words |
| Percentage (n.) | ... is sold at ... (v. ph.) | Expressing time or condition/ result: |
| Cost price (n. ph.) | The marked/cost/selling price of ... (n. ph.) | Ago... |
| Selling price (n. ph.) | ... off (adv.) | After... |
| Profit (n.) | At a profit/discount/loss of ... (n. ph.) | |
| Loss (n.) | Suffer (v.) | |
| Marked price (n. ph.) | Respectively (adj.) | |
| Discount (n.) | | |

Task 8. My learning record

Put a tick (✓) if you think you can manage the item in this unit.

Do I know...?

| | Item: | Yes (✓) / No (X) |
|----|---|---------------------|
| 1. | the concept of selling price/marked price/cost price, profit/loss, and discount/discount per cent. | |
| 2. | How to solve problems involving profit and loss and discount | |
| 3. | <p>the following language to solve problems involving profit/loss and discount:</p> <p><i>Selling price, marked price, cost price, profit, loss, discount, \ Discount per cent, respectively</i></p> <p><i>[A] sells [B] for/at [a number]</i> <i>[A] is sold at/for [a number]</i> <i>At a profit/loss of [%]</i> <i>suffer a loss of [%]</i> <i>A discount of [%]</i> <i>[%] off</i></p> | |



