Teacher guidance

Key focus

This objective is the everyday "find X% of Y" skill, and should be taught alongside financial contexts (GST, simple interest, markups, depreciation) so students see immediately why the skill matters. The core method – writing the percentage as a decimal and multiplying – is a single, reusable idea; the financial contexts are applications of it, not new methods. Successive percentage increase and decrease (e.g. repeated compounding as a single formula) is covered separately; here, compound interest appears only as the same one-period method applied more than once, calculated year by year.

Suggested teaching sequence

1. Revisit benchmark percentages (10%, 25%, 50%, 75%) using mental strategies (halving, dividing by 10 or 4).
2. Introduce the decimal-multiplier method: write the percentage as a decimal, then multiply by the quantity – this works for any percentage, common or not.
3. Extend to percentages above 100% (multiplier greater than 1) and percentages with a decimal point (e.g. 12.5%, 4.5%).
4. Introduce GST: multiplying by the GST rate (as a decimal) gives the GST amount; adding 1 to the rate before multiplying gives the GST-inclusive price directly.
5. Introduce simple interest: interest $=$ principal $\times$ rate $\times$ time, applying the percentage-of-a-quantity method with an extra time factor.
6. Introduce single-period depreciation and markup: multiplying by (1 $-$ rate) or (1 $+$ rate) gives the new value directly.
7. Extend to compound interest: apply the one-period method again to the new value, one year at a time, and contrast the year-by-year total with a single-step calculation on the original amount to highlight why they differ.
8. Introduce reverse problems: given the result of a percentage calculation, divide by the decimal multiplier to find the original quantity or rate.

Core examples to model

- Basic: 25% of 40: $0.25 \times 40 = 10$.
- GST: GST on an \$85 item at 15%: $0.15 \times 85 = 12.75$; GST-inclusive price: $85 \times 1.15 = 97.75$.
- Simple interest: \$500 at 4% per year for 3 years: $500 \times 0.04 \times 3 = 60$.
- Depreciation (one period): an \$18 000 car depreciating 12%: new value $= 18\,000 \times 0.88 = 15\,840$.
- Compound interest (year by year): \$2000 at 5% per year for 2 years: Year 1 $= 2000 \times 1.05 = 2100$; Year 2 $= 2100 \times 1.05 = 2205$.
- Reverse (find the original): a GST-inclusive price of \$138 at 15% GST: original price $= 138 \div 1.15 = 120$.

Watch for

- Multiplying by the percentage as a whole number (e.g. $\times 15$) instead of as a decimal ($\times 0.15$).
- For GST-inclusive price, adding the GST amount as a separate step instead of multiplying by 1.15 directly (both work, but mixing them causes errors).
- In simple interest, forgetting the time factor and calculating only principal $\times$ rate.
- In compound interest, applying the rate to the original amount every year instead of to the previous year's new value.
- In reverse problems, multiplying by the rate instead of dividing (to undo a GST-inclusive price, divide by 1.15; to undo a 15% discount, divide by 0.85, not 1.15).
- Confusing single-period depreciation calculated correctly here with the separate skill of expressing an overall percentage change, which belongs to the increasing/decreasing-by-a-percentage objective.

Checks for understanding

- Can students find a percentage of a quantity using the decimal-multiplier method, for common and uncommon percentages?
- Can they apply the method to GST, both finding the GST amount and the GST-inclusive price?
- Can they calculate simple interest using principal $\times$ rate $\times$ time?
- Can they apply a single-period depreciation or markup directly as a multiplier?
- Can they calculate compound interest year by year, and explain why it differs from a single-step calculation on the original amount?
- Can they work backwards from a known result to find the original quantity or an unknown rate?