Developing proportional reasoning through tax and super tasks

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Year 9 - How does career interruption impact taxation paid and superannuation saved?

Curriculum connections

Number and Algebra: Money and financial mathematics

- Solve problems involving simple interest (VCMNA304).

Number and Algebra: Patterns and algebra

- Apply set structures to solve real-world problems (VCMNA307).

Mathematical focus

There are several mathematical foci in this task: data collection, analysis, representation, interpretation, and scenario modelling. These are important tools for critical thinking and decision making. The act of collecting and collating data provides an opportunity for discussion of the quality of data and the impact of outliers. Statistical analysis includes the calculation of measures of central tendency (mean, median, mode) and measures of dispersion (range, interquartile range, variance/standard deviation), and determining how these measures help us understand the data.

While the learning task might be accessed and solved simply using averages multiplied by time, there is ample opportunity to challenge students to take a deeper, more precise approach via the extending prompts. Modelling of taxation and superannuation over time involves calculations using known quantities (e.g., number of working years, tax rates) and assumptions (e.g., average gross and taxable income). Justification of assumptions is important for their credibility (e.g., source of average income data, using mean versus median income). Decisions need to be made about the desired degree of accuracy, from a simple 'no changes from initial conditions' calculation to one involving changes in variables (e.g., income growth rate) and the time value of money (e.g., present value of future amounts due to impact of inflation over time). For example, calculation of a superannuation balance involves both the annual contribution (e.g, 9.5% of gross income) and the compound interest on previous contributions (which requires assumptions about the annual return on investment), as well as taxation on superannuation contributions and gains. Decisions also need to be made on the appropriate ways to communicate results so as to fairly represent the data and calculations.

Key language: Introduce or revise such terms as *taxation*, *superannuation*, *career interruption*, *parental leave*, *retirement*, *interest*, and *average*.

Useful information:
The average Australian weekly income for full-time workers is $1634 (gross / before tax).

The progressive tax scale for Australian residents in 2020 is as follows:

Taxable income	Tax on this income
0 – $18,200	Nil
$18,201 – $37,000	19c for each $1 over $18,200
$37,001 – $90,000	$3,572 plus 32.5c for each $1 over $37,000
$90,001 – $180,000	$20,797 plus 37c for each $1 over $90,000
$180,001 and over	$54,097 plus 45c for each $1 over $180,000

The Superannuation Guarantee Contribution (SGC) means employers must contribute 9.5% of employees' gross income to their nominated superannuation account.

Learning task

Each student is asked to interview two adults over the age of 35 (one male and one female). Interview questions might include:

- How old were you when you started working full-time?
- Has your career been interrupted by periods where you were unable to work, or worked part-time? If so, for how long?
- What caused you to take a lengthy period of time away from work (i.e., becoming a parent and caring for young children, study, travel, illness, caring for a parent)?
- At what age would you like to retire?

The class will use a spreadsheet to compile all data collected (hopefully 50+ responses). Then, students will work in small groups to analyse, interpret, and present findings. Questions to be explored might include, but are not limited to:

- What is the average number of years people plan to work?
- What then, is the average amount of taxation paid and superannuation saved over the course of one's working life?
- What is the average length of time that a career is interrupted?
- What is the most common reason given for career interruption?
- Can you calculate the average impact (in dollars) of career interruption on taxation paid and superannuation saved?

Students should prepare charts and graphs that show overall results and compare results for males and females.

Enabling prompts:

- What questions could you explore using this data?
- What is the minimum and maximum number of years that people plan to work? Compare the values overall for men and for women.
- What is the average (mean) number of working years overall? For men? For women?
- What is the median number of working years overall? For men? For women?
- What is the modal number of working years overall? For men? For women?
- Where could you find information about the average annual income in Australia?
- How much income tax would be paid by someone on the average income in Australia?
- How much employer superannuation contributions would be saved over the average working life?

Extending prompts:

- What questions could you explore using this data?
- Create a spreadsheet to more accurately examine the impact of career interruption on taxation paid and superannuation saved.
- Create a formula that calculates the average lifetime amount of taxation paid and superannuation saved assuming income increases annually at 1%, 3%, or 5% from the previous working year.
- Create a formula that calculates the average lifetime amount of taxation paid and superannuation saved in today's dollars assuming long term inflation of 2%.

Important pedagogical considerations

- Invite students to share what they know and understand about tax and super. They may be working and therefore paying tax and receiving super contributions.
- Make sure students record their mathematical working and their explanations.
- Ask students to convince you that their solutions are mathematically sound.
- Remind students to check the appropriateness of their solution against the problem, as well as any potential impact on individuals, families, communities and society.

Student handout

If you would like to use a student handout for this task, please print out the next page.

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Data collection

Interview two adults over the age of 35 (one male and one female). Interview questions might include:

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Data analysis

Work in small groups to analyse, interpret, and present findings. Questions to be explored might include, but are not limited to:

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