 Year 11 Mathematics Standard

Unit title: MS-F1 Money Matters

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Duration: Term 1 - 5 weeks 4 days

Rationale

Everyone engages in money transactions of some form, whether by earning money, spending money or managing money. The skills required to handle money is key to financial security. Financial literacy is imperative for all members of the society.

Topic focus

The principal focus of this subtopic is to calculate and graph simple interest, manage earnings, wages and taxation, and develop an appropriate budget for a given situation.

Students develop an ability to justify various types of financial decisions which will affect their life now and into the future.

Within this subtopic, schools have the opportunity to identify areas of Stage 5 content which may need to be reviewed to meet the needs of students.

Prior knowledge required

The material in this topic builds on content from the Number and Algebra Strand of the K–10 Mathematics syllabus, including the Stage 5.1 and 5.2 sub-strands of Financial Mathematics and Linear Relationships.

Language considerations

* allowable tax deductions
* allowance
* annual leave
* annual leave loading
* asset
* book value
* budget
* benefit
* commission
* compound interest
* compounding period
* comprehensive insurance
* compulsory insurance
* deduction
* depreciation
* depreciation schedule
* discount
* discretionary spending
* expenses
* fixed spending
* fuel consumption rate
* goods and services tax (GST)
* gross income
* gross pay income
* income tax
* interest
* interest rate
* loan repayment
* loss
* market value
* Medicare levy
* net pay
* non-compulsory insurance
* on-road costs
* original price (or cost)
* overtime
* Pay As You Go (PAYG)
* payment summary
* penalty rate
* pension
* percentage
* period
* piecework
* profit
* recurrence relation refund
* royalty
* running costs
* salary
* sale price
* scrap value
* simple interest
* sliding scale
* stamp duty
* straight-line method
* superannuation
* tax deduction
* tax instalment
* tax payable
* tax return
* tax scale
* taxable income
* third-party insurance
* useful life
* vehicle registration
* wage
* wage-sheet

Outcomes

A student:

* represents information in symbolic, graphical and tabular form MS11-2
* models relevant financial situations using appropriate tools MS11-5
* makes predictions about everyday situations based on simple mathematical models MS11-6
* uses appropriate technology to investigate, organise and interpret information in a range of contexts MS11-9
* justifies a response to a given problem using appropriate mathematical terminology and/or calculations MS11-10

Assessment (including formative and summative)

Formative Assessment

* Students working in small groups to brainstorm what they know about Financial Mathematics.
* Teacher observes student engagement during in-class problem-solving tasks
* Teacher monitors the completion of homework tasks including the Spreadsheet Workbook
* Teacher collects samples of student work to informally assess individual progress
* Students are provided with to contribute to class discussion and/or group work
* Teacher poses key questions when working in one-to-one situations with students
* Each lesson starts with a brief (5 min) quiz that reviews the key concepts of previous lessons and key skills that will be required in the lesson that will follow.

Summative Assessment

MS-F1 Money Matters – Assessment Task

F1.1 Interest and Depreciation

| Content | Teaching and learning strategies and evidence of learning | Resources |
| --- | --- | --- |
| * calculate simple interest for different rates and periods (ACMEM064) ◊  Information and communication technology capability icon
	+ apply percentage increase or decrease in various contexts, for example calculating the goods and services tax (GST) payable on a range of goods and services, and calculating profit or loss in absolute and percentage terms Personal and social capability icon Work and enterprise
	+ use digital technology or otherwise to compare simple interest graphs for different rates and periods  Information and communication technology capability icon
 | * Show the video “Bank Business” to introduce the concept of interest.
* Introduce vocabulary and variables for simple interest formula.
	+ Simple Interest (I) — amount of money paid or earned for the use of money,
	+ Principal (p) — the amount of money borrowed or invested,
	+ Rate (r) — the annual interest rate written as a decimal,
	+ Time (t) — the amount of time in years (If time is given in months, it must be written as a fraction. For example, 6 months would be 6/12 years or 0.5 years.)
* Students use a graphing program such as graphfree/Desmos to graph equations of the form I=Prt. Altering t and r, one at a time, to conclude their influence on the graph.
* Show the video “Do shops charge too much?” to introduce mark-ups as an example of percentage increase.
* Get students to search jobs that will use percentage increase and decrease as a part of their work
 | * [Bank Business](http://www.abc.net.au/btn/story/s3349497.htm) - http://www.abc.net.au/btn/story/s3349497.htm
* [Solving problems with percentages](http://www.amsi.org.au/ESA_Resources/Q1770/Q1770_1.html) http://www.amsi.org.au/ESA\_Resources/Q1770/Q1770\_1.html
* [Graphfree](http://www.graphfree.com/) - http://www.graphfree.com/
* [Desmos](https://www.desmos.com/) - https://www.desmos.com/
* Resource 1 – Simple Interest spreadsheet
* [Do shops charge too much?](http://splash.abc.net.au/home#!/media/29682/) - http://splash.abc.net.au/home#!/media/29682/
* [Search results for ‘markups’ at Choice website](https://www.choice.com.au/search?q=markups&cp=2&pp=1#results) - https://www.choice.com.au/search?q=markups&cp=2&pp=1#results
* Resource 2 – Percentage change spreadsheet
 |
| * calculate the depreciation of an asset using the straight-line method as an application of the simple interest formula **AAM** ◊
	+ use $S=V\_{0}-Dn$, where $S$ is the salvage value of the asset after $n$ periods, $V\_{0}$ is the initial value of the asset, $D$ is the amount of depreciation per period, and $n$ is the number of periods
 | * Students to choose a car and then for that car use a depreciation calculator to measure its depreciation over time, or compare the depreciation of two cars over time.
 | None |
| * use a spreadsheet to calculate and graph compound interest as a recurrence relation involving repeated applications of simple interest **AAM** ◊  Information and communication technology capability icon
 | * A recurrence relation occurs when each successive application uses the resultant value of the previous application to generate the next value. Examples include compound interest and annuities where the interest earned and value at the end of the period are calculated each period using the simple interest formula.
 | * Resource 3: Recurrence relation spreadsheet
 |

F1.2 Earning and managing money

| Outcomes and Content | Teaching and learning strategies and evidence of learning | Resources |
| --- | --- | --- |
| * calculate monthly, fortnightly, weekly, daily or hourly pay rates from a given salary, wages involving hourly rates and penalty rates, including situations involving overtime and other special allowances, and earnings based on commission (including commission based on a sliding scale), piecework or royalties ◊  Information and communication technology capability icon Personal and social capability icon Civics and citizenship icon Work and enterprise
 | * Define different ways of earning an income (wage, salary, commission, piecework, etc.) by researching the different options using a job advertisement website and creating a graphic organiser with the following structure:

the image shows an example of the table required for the exercise.  It has 3 columns with the headings "term", "definition" and "example"  There are 7 rows below the headings. Under "term" are the following terms "wage", "salary", "penalty rates", "overtime", "commission", "piecework" and "royalties".  The remaining rows under the headings "definition" and "example" are left blank.* Calculate income based on differing hourly rates, including overtime payments, using timesheets and payslips
* Explore commission payments, based on varying percentages, as well as sliding scales and retainer payments
* Explore the effect of modern technology on royalty payment rates and discuss piracy and copyright laws
* Compare wage rates for different careers in other countries
* Use the Australian Government’s Fair Work Ombudsman website to look up the penalty rates and allowances for a list of jobs
* Students explore a payslip using an interactive from [business.gov.au](https://www.business.gov.au/)
 | * Job advertisement websites:
	+ [SEEK](http://www.seek.com) - www.seek.com.au
	+ [Adzuna](https://www.adzuna.com.au/) - https://www.adzuna.com.au/
* [Penalty rates and allowances](https://www.fairwork.gov.au/pay/penalty-rates-and-allowances) (Fair Work Ombudsman) - https://www.fairwork.gov.au/pay/penalty-rates-and-allowances
* [First job](https://s3-ap-southeast-2.amazonaws.com/mst-resources/first-job/index.htm) - https://s3-ap-southeast-2.amazonaws.com/mst-resources/first-job/index.htm
 |
| * + calculate annual leave loading
 | * Students can access information on annual leave and leave loading from the Law Access NSW website
* Students to calculate the annual leave loading and total holiday pay for a job of their choice and a variety of other professions.
 | * [Annual leave and leave loading](http://www.lawaccess.nsw.gov.au/Pages/representing/lawassist_employmentrights/wages_and_entitlements/what_am_i_entitled_to/unpaid_leave/annual_leave_and_leave_loading.aspx) – Law Access NSW
 |
| * + calculate payments based on government allowances and pensions (ACMGM003)
 | * Explore government websites, including Centrelink, to research and calculate special allowances for a variety of people, (e.g. Youth Allowance, Austudy, Age Pension etc.)
* Use Centrelink’s payment and service finder website to compare and contrast payments available to people in two different situations.
 | * [Centrelink](https://www.humanservices.gov.au/individuals/centrelink) - https://www.humanservices.gov.au/individuals/centrelink
* [Payment rates for Youth Allowance](https://www.humanservices.gov.au/customer/enablers/payment-rates-youth-allowance) -https://www.humanservices.gov.au/customer/enablers/payment-rates-youth-allowance
* [Austudy](https://www.humanservices.gov.au/individuals/services/centrelink/austudy) - https://www.humanservices.gov.au/individuals/services/centrelink/austudy
* [Age Pension](https://www.humanservices.gov.au/individuals/services/centrelink/age-pension) - https://www.humanservices.gov.au/individuals/services/centrelink/age-pension
* [Payment and Service Finder](https://www.centrelink.gov.au/custsite_pfe/pymtfinderest/paymentFinderEstimatorPage.jsf?wec-appid=pymtfinderest&wec-locale=en_US)
 |
| * calculate income tax ◊
	+ identify allowable tax deductions Ethical understanding icon Personal and social capability icon Civics and citizenship icon Work and enterprise icon
 | * Students to complete activities from the Tax, Super and You website which allows them to investigate what take is, who pays and why.

Students to complete a jigsaw around allowable tax deductions as outlined on the Australian Tax Office website.* Break students into groups of up to 7
* Assign each student in the group to one of the following types of deductions
	+ Vehicle and travel expenses
	+ Clothing, laundry and dry-cleaning expenses
	+ Gifts and donations
	+ Home office expenses
	+ Interest, dividend and other investment income deductions
	+ Self-education expenses
	+ Tools, equipment and other equipment
* Give students time to investigate their section of the website
* Bring together students who read the same section to discuss the main points of their segment
* Students return to their original groups and take turns to present. Students who are listening record the results in a graphic organiser
 | * Pre-test: [How much do I know about tax?](https://www.taxsuperandyou.gov.au/course/439/pre-test-how-much-do-i-know-about-tax) - https://www.taxsuperandyou.gov.au/course/439/pre-test-how-much-do-i-know-about-tax
* Tax: [Who, What, How and Why](https://www.taxsuperandyou.gov.au/course/433/tax-who-what-how-and-why) - https://www.taxsuperandyou.gov.au/course/433/tax-who-what-how-and-why
* [Income and Income Tax](https://www.taxsuperandyou.gov.au/course/442/income-and-income-tax) - https://www.taxsuperandyou.gov.au/course/442/income-and-income-tax
* [Working and Paying Tax](https://www.taxsuperandyou.gov.au/course/443/working-and-paying-tax) - https://www.taxsuperandyou.gov.au/course/443/working-and-paying-tax
* [Deductions you can claim](https://www.ato.gov.au/Individuals/Income-and-deductions/Deductions-you-can-claim/) - https://www.ato.gov.au/Individuals/Income-and-deductions/Deductions-you-can-claim/
* Resource 4 – Tax payable spreadsheet
 |
| * + calculate taxable income after allowable tax deductions are taken from gross pay Work and enterprise
	+ calculate the Medicare levy (basic levy only)
	+ calculate net pay following deductions from income
	+ calculate the amount of Pay As You Go (PAYG) tax payable per fortnight or week using current tax scales, and use this to determine if more tax is payable or if a refund is owing after completing a tax return Work and enterprise
 | * Students use an online tool to investigate a scenario and calculate an individual’s tax liability
* Students use the Tax, Super and You website to investigate the processing for completing a tax return and calculating how much tax you have to pay.
* Students use the Medicare levy calculator to determine the amount of the levy for a particular person
* Using current tax brackets, calculate PAYG tax, relating to various income rates. Additionally, determine whether refunds or extra tax is required. Calculate the net pay defined as gross pay minus all deductions (including tax) and students to use the pay calculator website to comparing differences in tax payable, net income etc. for different jobs within the one sector and/or use the year function in the pay calculator to see how salaries have changed over time
 | * [The financial wizard's apprentice: taxation](https://schoolsequella.det.nsw.edu.au/file/44828baf-e540-4c79-9f2c-4ce180432ad9/1/financial_wizard.zip/financial_wizard/units/fm3_tax.html)
* [Completing your tax return](https://www.taxsuperandyou.gov.au/course/444/completing-your-tax-return) - https://www.taxsuperandyou.gov.au/course/444/completing-your-tax-return
* [Calculating tax due](https://www.taxsuperandyou.gov.au/course/445/calculating-tax-due) – Tax Super and You: https://www.taxsuperandyou.gov.au/course/445/calculating-tax-due
* [Medicare levy calculator](https://www.ato.gov.au/Calculators-and-tools/Host/?anchor=MedicareLevy&anchor=MedicareLevy&anchor=MedicareLevy/questions#MedicareLevy/questions)
* [Pay Calculator](https://www.paycalculator.com.au/): https://www.paycalculator.com.au/
 |
| * use technology to perform financial computations, for example calculating percentage change, calculating tax payable and preparing a wage-sheet ◊  Information and communication technology capability icon Work and enterprise icon
 | * Explore tax calculations, using a range of online tools as well as Excel. Discuss resultant graph as a piecewise linear function, by choosing two incomes from different income types
 | * [Individual income tax rates 2017-2018](https://www.ato.gov.au/rates/individual-income-tax-rates/?=top_10_rates) - https://www.ato.gov.au/rates/individual-income-tax-rates/?=top\_10\_rates
* [Simple tax calculator](https://www.ato.gov.au/Calculators-and-tools/Host/?anchor=STC&anchor=STC#STC/questions) - https://www.ato.gov.au/Calculators-and-tools/Host/?anchor=STC&anchor=STC#STC/questions
* Resource 5 – Wage- sheet spreadsheet
 |

F1.3: Budgeting and household expenses

| Outcomes and Content | Teaching and learning strategies and evidence of learning | Resources |
| --- | --- | --- |
| * interpret and use information about a household’s electricity, water or gas usage and related charges and costs from household bills **AAM** ◊ Sustainability icon Civics and citizenship icon
 | * Students read and interpret household bills, explore the various fees charged by organisations and determine ways to minimise costs
 | * Energy Australia: [Find your way around your bill](https://www.energyaustralia.com.au/home/bills-and-accounts/pay-your-bill/understand-your-bill/bill-guides) - https://www.energyaustralia.com.au/home/bills-and-accounts/pay-your-bill/understand-your-bill/bill-guides
* Sydney Water: [About your bill](http://www.sydneywater.com.au/SW/accounts-billing/understanding-your-bill/about-your-bill/index.htm) - http://www.sydneywater.com.au/SW/accounts-billing/understanding-your-bill/about-your-bill/index.htm
* Origin Energy: [How to read my bill](https://www.originenergy.com.au/for-home/my-account/usage/how-to-read-my-bill.html) - https://www.originenergy.com.au/for-home/my-account/usage/how-to-read-my-bill.html
 |
| * plan for the purchase of a car **AAM** ◊ Critical and creative thinking icon Personal and social capability icon
	+ investigate on-road costs for new and used vehicles, including sale price (or loan repayments), registration, insurance and stamp duty at current rates Literacy icon Civics and citizenship icon
	+ consider sustainability when choosing a vehicle to purchase, eg fuel consumption rates Sustainability icon
	+ calculate and compare the cost of purchasing different vehicles using a spreadsheet Critical and creative thinking icon  Information and communication technology capability icon
 | * Research the cost of different car types and features including fuel economy, tare weight and engine size. Discuss legislations and licence limitations surrounding young drivers (high performance vehicles and P plate drivers) as well as car safety checks.
* Investigate the cost involved with owning a vehicle including maintenance and on-road costs. Make comparisons between different car models and service providers (e.g. sedan versus 4WD, insurance companies, stamp duty etc.) using the practical money skills website
* Research the various types of car insurance including: compulsory and non-compulsory third party insurance as well as comprehensive insurance. Discuss the benefits of each type.
* Compare financial options when purchasing a car (cash, finance, bank loan etc.) and determine the extra charges involved with each option, as a part of the “Show me the money!” project
* Evaluate the environmental impact of a variety of cars, e.g. fuel consumption rates
* Create various spreadsheets to compare the cost of purchasing different vehicles, insurance prices, running costs, etc.
 | * [Car sales](http://www.carsales.com.au): www.carsales.com.au
* [Car safety check before buying](http://www.scootle.edu.au/ec/viewing/L1366/index.html): http://www.scootle.edu.au/ec/viewing/L1366/index.html
* [Buying a Car](http://www.practicalmoneyskills.com.au/personal-finance/life-events/buying-a-car/) (Practical Money Skills): http://www.practicalmoneyskills.com.au/personal-finance/life-events/buying-a-car/
* [Secured Car Loan Calculator](https://www.stgeorge.com.au/personal/personal-loans/calculators/car-loan-calculator) (St George Bank): https://www.stgeorge.com.au/personal/personal-loans/calculators/car-loan-calculator
* Resource 6 – Cost of purchasing a car spreadsheet
 |
| * plan for the running and maintenance of a car **AAM** ◊ Critical and creative thinking icon Personal and social capability icon
	+ describe the different types of insurance available, including compulsory and non-compulsory third-party insurance, and comprehensive insurance Literacy icon Personal and social capability icon
	+ investigate other running costs associated with ownership of a vehicle, eg cost of servicing, repairs and tyres Literacy icon Personal and social capability icon
 | * Research the various types of car insurance including: compulsory and non-compulsory third party insurance as well as comprehensive insurance. Discuss the benefits of each type.
* Investigate the cost involved owning a vehicle including maintenance and on-road costs. Make comparisons between different car models and service providers (e.g., Sedans V 4WD, insurance companies, stamp duty etc.)
* Create various spreadsheets to compare the cost of purchasing different vehicles, insurance prices, running costs, etc.
 | * [MoneySmart teaching](https://www.moneysmart.gov.au/tools-and-resources/videos/video-in-the-drivers-seat-moneysmart-rookie): https://www.moneysmart.gov.au/tools-and-resources/videos/video-in-the-drivers-seat-moneysmart-rookie
* Resource 7 – Running costs spreadsheet
 |
| * prepare a personal budget for a given income, taking into account fixed and discretionary spending (ACMGM004) AAM ◊ Critical and creative thinking icon  Information and communication technology capability icon Civics and citizenship icon
 | * Students use the Financial Wizard’s Apprentice to prepare a budget for a person.
* Create a personal budget using ASIC’s Money Smart Budget Planner
* Use Excel spreadsheet and/or on-line tools to create a balanced personal budget by using the “Show me the money!” assignment data
 | * [Budgets](http://lrrpublic.cli.det.nsw.edu.au/lrrSecure/Sites/Web/financial_wizard/units/fm1_budget.html) (The Financial Wizard's Apprentice)
* [Budget Planner](https://www.moneysmart.gov.au/tools-and-resources/calculators-and-apps/budget-planner) (ASIC’s Money Smart): https://www.moneysmart.gov.au/tools-and-resources/calculators-and-apps/budget-planner
* Spreadsheet 8 – Personal budget spreadsheet
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Reflection and Evaluation: