# Mathematics Stage 5 – unit of learning – financial mathematics



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## Rationale

The NSW Department of Education publishes a range of curriculum support materials, including samples of lesson sequences, scope and sequences, assessment tasks, examinations, student and teacher resource booklets, and curriculum planning and curriculum evaluation templates. The samples are not exhaustive and do not represent the only way to complete or engage in each of these processes. Curriculum design and implementation is a dynamic and contextually-specific process. While the mandatory components of syllabus implementation must be met by all schools, it is important that the approach taken by teachers is reflective of their needs and faculty/school processes.

NESA defines [programming](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/understanding-the-curriculum/programming) as the process of ‘selecting and sequencing learning experiences which enable students to engage with syllabus outcomes and develop subject specific skills and knowledge’ ([NESA](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/understanding-the-curriculum/programming) 2022). A program is developed collaboratively within a faculty. It differs from a unit in important ways, as outlined by NESA on their [advice on units](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/understanding-the-curriculum/programming/advice-on-units) page. A unit is a contextually-specific plan for the intended teaching and learning for a particular class for a particular period. The organisation of the content in a unit is flexible and it may vary according to the school, the teacher, the class, and the learning space. They should be working documents that reflect the thoughtful planning and reflection that takes place during the teaching and learning cycle. There are mandatory components of programming and unit development, and this template provides one option for the delivery of these requirements. The NESA and department guidelines that have influenced this template are elaborated upon at the end of the document.

This resource has been developed to assist teachers in NSW Department of Education schools to create learning that is contextualised to their classroom. It can be used as a basis for the teacher’s own program, assessment, or scope and sequence, or be used as an example of how the new curriculum could be implemented. The resource has suggested timeframes that may need to be adjusted by the teacher to meet the needs of their students.

## Overview

**Description:** this program of learning addresses content from the focus areas of Financial mathematics A and Equations A. The lessons and sequences in this program of learning are designed to allow students to explore number and algebra skills and build students’ knowledge and understanding of earning and spending money by relating the concepts to a real world context.

**Duration:** this program of learning is designed to be completed over a period of approximately 3 weeks, but can be adapted to suit the school context.

**Explicit teaching:** suggested learning intentions and success criteria are available for some lessons provided. Learning intentions and success criteria are most effective when they are contextualised to meet the needs of students in the class. The examples provided in this document are generalised to demonstrate how learning intentions and success criteria could be created.

## Outcomes

### Core

A student:

* develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly
**MAO-WM-01**
* **solves financial problems involving simple interest, earning money and spending money MA5-FIN-C-01**
* **solves linear equations of up to 3 steps, limited to one algebraic fraction MA5-EQU-C-01**

### Related Life Skills outcomes

The identified Life Skills outcomes that relate to this unit are **MALS-FIN-01** – demonstrates knowledge of money in everyday contexts, and **MALS-FIN-02** – plans and manages personal finances.

[Mathematics K–10 Syllabus](https://curriculum.nsw.edu.au/syllabuses/mathematics-k-10-2022) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2022.

**Prior to planning for teaching and learning, please consider the following:**

**Engagement**

* How will I provide authentic, relevant learning opportunities for students to personally connect with lesson content?
* How will I support every student to grow in independence, confidence, and self-regulation?
* How will I facilitate every student to have high expectations for themselves?
* How will I identify and provide the support each student needs to sustain their learning efforts?

**Representation**

* What are some different ways I can present content to enable every student to access and understand it?
* How will I identify and address language and/or cultural considerations that may limit access to content for students?
* How will I make lesson content and learning materials more accessible?
* How will I plan learning experiences that are relevant and challenging for the full range of students in the classroom?

**Expression**

* How will I provide multiple ways for students to respond and express what they know?
* What tools and resources can students use to demonstrate their understanding?
* How will I know every student has understood the concepts and language presented in each lesson?
* How will I monitor if every student has achieved the learning outcomes and learning growth?

## Lesson sequence and details

### Learning episode 1 – how much will I earn?

#### Teaching and learning activity

Students will use part time jobs and shift allocations to calculate wage and overtime payments. Students will use their knowledge of wages and overtime to maximise their earnings. The final part of the lesson is using earnings and overtime to solve up to 3-step equations.

#### Syllabus content

* Solve problems involving wages given an hourly rate of pay including penalty rates for overtime, weekends and public holidays
* Solve linear equations using algebraic techniques involving up to 3 steps
* Represent word problems as linear equations, solve the equations and interpret the solutions in the context of the problem

Table 1 – lesson details

|  |  |  |
| --- | --- | --- |
| Visible learning | Required resources | Registration, adjustments and evaluation notes |
| [How much will I earn?](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-01-how-much-will-i-earn.docx)Duration: 1 lessonLearning intentions* To know when overtime payments are paid and at what rates.
* To be able to calculate earnings from wages.

Success criteria* I can calculate wages given an hourly rate and the number of hours worked.
* I can find the hours worked or hourly rate when given the total wage.
* I can calculate wages including overtime.
* I can solve equations up to 3-step equations.
 | * [*How much will I earn?*](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-01-how-much-will-i-earn.pptx) PowerPoint
* Appendix A ‘Award cards’ need to be printed (double sided) so that each group of 4 has one of each card
* One copy per group of Appendix C ‘Which award is better?’ printed on A3
* Class set of Appendix B ‘Weekly staff roster’
* Class set of Appendix D ‘An easier way to calculate’
 |  |

### Learning episode 2 – what should I do when I am older?

#### Teaching and learning activity

Students will be using the salaries of different jobs predicted to be necessary in 2030 to calculate weekly, fortnightly and yearly income.

#### Syllabus content

* Calculate weekly, fortnightly, monthly and yearly earnings assuming 1 year = 52 weeks

Table 2 – lesson details

|  |  |  |
| --- | --- | --- |
| Visible learning | Required resources | Registration, adjustments and evaluation notes |
| [What should I do when I am older?](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-02-what-should-i-do-when-i-am-older.docx)Duration: 1 lessonLearning intention* To understand the concept of a salary.

Success criteria* I can calculate weekly, fortnightly, monthly and annual earnings.
* I can explain why converting directly between weekly and monthly earnings must be calculated as an annual amount first.
 | * Appendix A ‘Jobs in demand today’ either projected or a class set
* Class set of Appendix B ‘Find the error!’
* Class set of Appendix C ‘How much money is that?’
 |  |

### Learning episode 3 – how much will it cost?

#### Teaching and learning activity

In this lesson students will use infographics to explore how much money they will need to spend on different needs and wants. Students will then plan a budget based on their research.

#### Syllabus content

* Calculate weekly, fortnightly, monthly and yearly earnings assuming 1 year = 52 weeks

Table 3 – lesson details

|  |  |  |
| --- | --- | --- |
| Visible learning | Required resources | Registration, adjustments and evaluation notes |
| [How much will it cost?](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-03-how-much-will-it-cost.docx)Duration: 1 lessonLearning intentions* To understand the purpose and benefits of budgeting.
* To create a budget, categorising expenses and allocating funds accordingly.

Success criteria* I can budget for weekly essentials.
* I can convert between weekly, monthly and yearly amounts.
 | * [*How much will it cost?*](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-03-how-much-will-it-cost.pptx)PowerPoint
* [*How much will it cost?*](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-03-how-much-will-it-cost.xlsx)Spreadsheet
* Class set of Appendix A, printed on A3
* Multiple sets of Appendix B printed in colour, on A3
* Class set of Appendix C and D, printed
* Digital device with internet access, per pair (optional)
 |  |

### Learning episode 4 – what? – more pay!

#### Teaching and learning activity

Students explore the different types of leave they are entitled to in Australia. They learn about the history of leave loading and how to calculate leave loading and total holiday pay.

#### Syllabus content

* Calculate weekly, fortnightly, monthly and yearly earnings assuming 1 year = 52 weeks
* Calculate leave loading by finding a percentage of eligible normal pay

Table 4 – lesson details

|  |  |  |
| --- | --- | --- |
| Visible learning | Required resources | Registration, adjustments and evaluation notes |
| [What? – more pay!](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-04-what-more-pay.docx)Duration: 1 lessonLearning intentions* To know that there are different types of leave.
* To be able to solve problems that involve leave loading.

Success criteria* I can define leave loading.
* I can calculate leave loading.
* I can calculate total pay for a period of leave.
 | * [*What? – more pay!*](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-04-what-more-pay.pptx) PowerPoint
* 5 or 6 printed copies of each leave fact sheet from Appendix A
* Appendix B, printed
 |  |

### Learning episode 5 – I need more money

#### Teaching and learning activity

Students investigate how to make money from royalties and piecework through a range of real world and relevant examples, including, copyright issues with music artists, Return and Earn and social media influencers.

#### Syllabus content

* Calculate earnings from non-wage sources exploring commission, piece work and royalties

Table 5 – lesson details

|  |  |  |
| --- | --- | --- |
| Visible learning | Required resources | Registration, adjustments and evaluation notes |
| [I need more money](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-05-i-need-my-more.docx)Duration: 1–2 lessonsLearning intentions* To be able to identify and describe earnings from non-wage sources.
* To be able to calculate earnings from non-wage sources.

Success criteria* I can list ways of earning money that do not involve wages or salaries.
* I can calculate money earned from royalties and piecework.
* I can the difference between wages, salaries, piecework and royalties.
 | * Class set of Appendix A and B, printed
* Devices with internet access per pair of students (optional)
 |  |

### Learning episode 6 – percentage of my earnings

#### Teaching and learning activity

Students discover, using an online commission calculator, how commission is calculated. The students then calculate commission using both tiered and non-tiered commissions, with and without retainers.

#### Syllabus content

* Calculate earnings from non-wage sources exploring commission, piece work and royalties

Table 6 – lesson details

|  |  |  |
| --- | --- | --- |
| Visible learning | Required resources | Registration, adjustments and evaluation notes |
| [Percentage of my earnings](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-06-percentage-of-my-earnings.docx)Duration: 1 lessonLearning intention* To know how people earn money from commission.
* To be able to perform commission calculations.

Success criteria* I can find a percentage of an amount.
* I can calculate a flat rate commission.
* I can calculate commission using tiered rates.
* I can explain the advantages and disadvantages of earning money through commission.
 | * [*Percentage of my earnings*](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-06-percentage-of-my-earnings.pptx) PowerPoint
* Class set of Appendix A, B and C, printed
* One device per person or between 2 to be able to access the online commission calculator
 |  |

### Learning episode 7 – is that fair?

#### Teaching and learning activity

Students discover what tax is and explore different systems of how income tax could be collected. Through this discovery, students determine which system is most fair for all workers and learn about the tax system in Australia.

#### Syllabus content

* Investigate sources of published tables or online calculators and use these to calculate the weekly, fortnightly or monthly tax to be deducted from a worker’s pay under the Australian Pay-As-You-Go (PAYG) taxation system

Table 7 – lesson details

|  |  |  |
| --- | --- | --- |
| Visible learning | Required resources | Registration, adjustments and evaluation notes |
| [Is that fair?](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-07-is-that-fair.docx)Duration: 1 lessonLearning intentions* To know about the income tax system of Australia.
* To be able to explain why one tax system is fairer than another.

Success criteria* I can describe what tax is and how it is used in Australia.
* I can use calculations to compare different systems for collecting tax.
* I can justify why one tax system is superior to another in terms of fairness.
 | * Class set of Appendix A, printed.
 |  |

### Learning episode 8 – the secrets to keeping more money

#### Teaching and learning activity

Students explore how taxable income is calculated and the factors that contribute to it increasing and decreasing. They investigate how to reduce taxable income to pay less tax.

#### Syllabus content

* Determine annual taxable income by exploring allowable deductions and current tax rates

Table 8 – lesson details

|  |  |  |
| --- | --- | --- |
| Visible learning | Required resources | Registration, adjustments and evaluation notes |
| [The secrets to keeping more money](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-08-the-secrets-to-keeping-more-money.docx)Duration: 1 lessonLearning intention* To understand how taxable income is calculated.

Success criteria* I can identify examples of earnings that individuals need to pay tax on.
* I can identify spendings that classify as an allowable tax deduction.
* I can calculate an individual’s taxable income.
* I can explain how to reduce an individual’s taxable income.
 | * [*The secrets to keeping more money*](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-08-the-secrets-to-keeping-more-money.pptx) PowerPoint
* Class set of Appendix A and B, printed
 |  |

### Learning episode 9 – how can I get my money back?

#### Teaching and learning activity

Students explore how tax payable is calculated using online calculators, a graph and using the tax rates tables. Students investigate pay as you go (PAYG) tax and net pay.

#### Syllabus content

* Investigate sources of published tables or online calculators and use these to calculate the weekly, fortnightly or monthly tax to be deducted from a worker’s pay under the Australian Pay-As-You-Go (PAYG) taxation system
* Calculate net earnings after deductions and taxation

Table 9 – lesson details

|  |  |  |
| --- | --- | --- |
| Visible learning | Required resources | Registration, adjustments and evaluation notes |
| [How can I get my money back?](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-09-how-can-i-get-my-money-back.docx)Duration: 1–2 lessonsLearning intentions* To understand how tax is calculated in Australia.
* To be able to calculate net earnings.

Success criteria* I can describe the taxation system in Australia.
* I can calculate the tax payable using an online calculator.
* I can calculate the tax payable using the tax rates tables.
* I can evaluate an individual’s net earnings.
 | * One individual device per pair of students (optional)
* [*How can I get my money back?*](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-09-how-can-i-get-my-money-back.pptx) PowerPoint
* Class set of Appendix A printed
 |  |

### Learning episode 10 – watch money grow

#### Teaching and learning activity

Students explore how money can increase through simple interest by looking at an investment scenario. Students then use online simple interest calculators to consider the different variables and what happens as one is altered.

#### Syllabus content

* Establish and use the formula $I=Prn$ to find simple interest where $I=$ simple interest, $P=$ principal, $r=$ interest rate per time period and $n=$ number of time periods
* Apply the simple interest formula to solve problems related to investing money at simple interest rates, both algebraically and graphically
* Solve linear equations using algebraic techniques involving up to 3 steps
* Solve linear equations arising from substitution into formulas
* Represent word problems as linear equations, solve the equations and interpret the solutions in the context of the problem

Table 10 – lesson details

|  |  |  |
| --- | --- | --- |
| Visible learning | Required resources | Registration, adjustments and evaluation notes |
| [Watch money grow](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-10-watch-money-grow.docx)Duration: 1 lessonLearning intention* To be able to solve problems involving simple interest calculations.

Success criteria* I can explain what simple interest is.
* I can compare different investments with varying interest rates and time periods.
* I can use the simple interest formula to solve problems.
* I can interpret simple interest graphs to solve problems.
 | * Device with internet access per pair of students
* [*Watch money grow*](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-10-watch-money-grow.pptx) PowerPoint
* Class set of Appendix A, B, and C, printed
 |  |

### Learning episode 11 – now or later?

#### Teaching and learning activity

Students explore different options of paying for an item, including buying on terms, 'buy now, pay later’ and short-term loans through fictional items and payment plans. Students will discover the advantages and disadvantages of these payment methods and decide if it is better to pay now or pay later.

#### Syllabus content

* Calculate the cost of buying items on terms, by paying an initial deposit and making regular repayments
* Examine payment options involving buy now, pay later and investigate the costs associated with these schemes for purchasing goods
* Examine the principles behind short-term loans involving small dollar amounts and compare borrowing costs associated with using these products

Table 11 – lesson details

|  |  |  |
| --- | --- | --- |
| Visible learning | Required resources | Registration, adjustments and evaluation notes |
| [Now or later?](https://education.nsw.gov.au/content/dam/main-education/en/home/schooling/curriculum/mathematics/mathematics-s5-unit-05-lesson-11-now-or-later.docx)Duration: 1 lessonLearning intention* To understand the advantages and disadvantages of various payment options.

Success criteria* I can calculate the costs and associated fees of using a payment option.
* I can list different payment options.
* I can analyse and compare different payment options.
 | * Class set of Appendix A and B, printed
 |  |

## References

[Mathematics K–10 Syllabus](https://curriculum.nsw.edu.au/learning-areas/mathematics/mathematics-k-10-2022/overview) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2022.

NESA (NSW Education Standards Authority) (2022) ‘[Programming](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/understanding-the-curriculum/programming)’, Understanding the curriculum, NESA website, accessed 31 May 2023.

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