Sample virtual program for Stage 4 Mathematics:

## Considerations for programming virtual classrooms

Guiding questions for establishing learning expectations and communication processes

|  |  |
| --- | --- |
| Guiding question |  |
| What are your students going to learn? (Learning Intentions) | Students will learn how to operate with percentages. |
| How are they going to learn it? (Resources and Strategies) | It is envisaged that all concepts will be introduced by the staff member via video conferencing and Microsoft Whiteboard, however, materials to supplement learning and independent learning activities have been provided for self-paced study |
| Target date for completion | 3 lesson sequence |
| How are you going to know that they learned it? (Success criteria) | 1. Students understand what a percentage is and how to calculate a percentage of a quantity
2. Students develop skills in being able to express one quantity as a percentage of another
3. Students solve problems involving the use of percentages, including percentage increases and decrease
 |
| Collecting evidence of student learning (Verification) | Activities provide formative assessment opportunities as student responses are collected. Students are provided with assessment as learning opportunities during interactive activities. |
| Feedback (Evaluation) | Staff can use video conferencing and Microsoft Whiteboard to lead student discussions and pose assessing and advancing questions. Staff can use these platforms to respond to student misconceptions identified through the formative assessment activities. |
| Communication | Staff can facilitate discussions and collaboration through video conferencing, such as Zoom or Microsoft Teams, and collaborative platforms, like Microsoft Whiteboard or Microsoft OneNote |

### Model 2 – Sharing resources for students to view/read and reflect on

It is envisaged that the following sequence of lessons would be facilitated by the peer discussions and conferencing, asynchronous discussion and mini-white board activities from the [Digital learning selector – Learning activities](https://app.education.nsw.gov.au/digital-learning-selector/LearningActivity/Browser?cache_id=240cd).

### Stage 4 – Percentages

Year 7

#### Background

Stage 3 Outcome:

A student compares, orders and calculates with fractions, decimals and percentages. MA3-7NA

##### Outcomes

A student:

* Communicates and connects mathematical ideas using appropriate terminology, diagrams and symbols MA4-1WM
* Applies appropriate mathematical techniques to solve problems MA4-2WM
* Recognises and explains mathematics relationships using reasoning MW4-3WM
* Operates with fractions, decimals and percentages MS4-5NA

All outcomes referred to in this unit come from [Mathematics K-10 Syllabus](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/mathematics/mathematics-k-10) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2012

|  |  |  |
| --- | --- | --- |
| Lesson sequence |  |  |
| 1  | 1. The staff member introduces the idea that there are multiple strategies that can be adopted to find percentages of quantities. Percentages of quantities can be calculated using mental, written and calculator methods. The staff member may like to use Microsoft Whiteboard or Microsoft OneNote in conjunction with video conferencing software to facilitate a discussion around what strategies the students already know (if applicable) and can share their preferred mental and written strategy. The staff member can then show the students how to calculate percentages of quantities using their calculators.
2. Students can then watch the mental strategies video to see other strategies used to calculate the percentages of quantities.
3. Students then practise these strategies by completing the Finding percentages worksheet and can submit answers via email or a shared drive.
4. Students may also like to play Playground Percentages. This is a basic online game where students are required to create a plan for a school using a 100 square grid.
 | Watch – [mental strategies](https://www.youtube.com/watch?v=JgkoDqzd-oo)Eddie Woo – [mental strategies](https://www.youtube.com/watch?v=f0hDmH901rw)[Finding percentages worksheet](https://www.math-salamanders.com/image-files/math-percentage-worksheets-find-percentages-3.gif)[Playground percentages](http://www.scootle.edu.au/ec/viewing/L133/index.html) |
| 2  | 1. Students are to be introduced to the idea that you can express one quantity as a percentage of another, using mental, written and calculator methods, for example 45 minutes is 75% of an hour. The staff member may like to use Microsoft Whiteboard or Microsoft OneNote in conjunction with video conferencing software to facilitate a discussion around what strategies the students already know (if applicable) and can share their preferred mental and written strategy.
2. Students can then watch the YouTube video ‘Writing one quantity as a percentage of another’ if they require further explanations and then complete the self-marking quiz from the Transum website.
 | Video: [Writing one quantity as a percentage of another](https://www.youtube.com/watch?v=KH265C3cpoc)[Self-marking quiz](https://www.transum.org/Maths/Exercise/Express_As_A_Percentage.asp?Level=1) |
| 3  | 1. The staff member is to bring relevance to the calculation of percentages of quantities by demonstrating their use in real life situations. Students are to learn mental, written and calculator methods of increasing and decreasing a quantity by a given percentage. Students can watch the YouTube video ‘Markup and discounts’ for explanations.
2. Students can then complete the ‘Using percentages for expressing discounts and comparing prices” activity from AMSI.
 | Video: [Markup and Discounts](https://www.youtube.com/watch?v=h1YcEQKdOr4)[Using percentages for expressing discounts and comparing prices](http://www.amsi.org.au/ESA_Resources/Q3420/Q3420_1.html) AMSI activity. |
| 4 - 6 | Students extend on lesson 3 percentages of quantities by continuing to focus on real life situations through the investigation of Profit and Loss. Staff members are to follow the Lesson instructions from the learning from home Profit and Loss resource. This resource is written for offline learning but can be adapted for use online. | [Profit and Loss](https://education.nsw.gov.au/content/dam/main-education/teaching-and-learning/curriculum/key-learning-areas/mathematics/media/documents/mathematics-s4-sample-offline-learning-profit-loss-rl.docx) Lesson Resource |
| Note to staff member | Additional resources: It is assumed that students would have some knowledge of fractions and decimals prior to this lesson sequence. The students can use the resources in the right-hand column to practise their skills in converting between fractions, decimals and percentages. | [Matching fractions, decimals and percentages](https://nrich.maths.org/1249)[Converting between fractions, decimals and percentages](https://www.bbc.co.uk/bitesize/guides/zq3d2nb/test) |

## Resource 1: if you have any resources or appendix they would be here

Further resources available to support the teaching of this unit from the learning from home website are:

[Best Buys](https://education.nsw.gov.au/content/dam/main-education/teaching-and-learning/curriculum/key-learning-areas/mathematics/media/documents/mathematics-s4-sample-offline-learning-best-buys-rl.docx) – 3 lessons for students to work through like the profit and loss resource.

[GST](https://education.nsw.gov.au/content/dam/main-education/teaching-and-learning/curriculum/key-learning-areas/mathematics/media/documents/mathematics-s4-sample-offline-learning-gst-rl.docx) – 3 lessons for students on concepts and skills related to GST (Goods and Services Tax).

[Raising the GST](https://education.nsw.gov.au/content/dam/main-education/teaching-and-learning/curriculum/key-learning-areas/mathematics/media/documents/mathematics-s4-raising-the-gst-rl.docx) – An investigation activity using spreadsheets to justify a GST increase.