Sample virtual program for Stage 5 Mathematics:

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| Guiding question |  |
| What are your students going to learn? (Objectives) | Students will learn how to calculate standard deviation and investigate its meaning |
| 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 using Microsoft Teams; however, materials to supplement learning and independent learning activities have been provided for self-paced study. |
| Target date for completion | 4 lessons |
| How are you going to know that they learned it? (Success criteria) | 1. Students investigate the meaning and calculation of standard deviation
2. Students calculate standard deviation using a scientific calculator
3. Students investigate the effect on the standard deviation, of adding a data value to a data set
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| 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 such as Microsoft Teams to lead student discussion 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 discussion, collaboration and sharing of files through video conferencing, like Microsoft Teams. |

### 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 discussion and conferencing, asynchronous discussion and mini-whiteboard activities from the [Digital learning selector – Learning activities](https://app.education.nsw.gov.au/digital-learning-selector/LearningActivity/Browser?cache_id=240cd).

### Single variable data analysis

Stage 5.3 Mathematics

* uses and interprets formal definitions and generalisations when explaining solutions and/or conjectures **MA5.3-1WM**
* generalises mathematical ideas and techniques to analyse and solve problems efficiently **MA5.3-2WM**
* uses deductive reasoning in presenting arguments and formal proofs **MA5.3-3WM**
* uses standard deviation to analyse data **MA5.3-18SP**

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| Lesson sequence |  |  |
| 1 | 1. Students are introduced to the concept and meaning of standard deviation. The teacher may like to use Microsoft Teams or other video conferencing facilities such as skype or zoom to facilitate. This could be supplemented by using the explanation on the Maths is fun website.
2. Students should replicate the activity on the Maths is fun website by using the heights of their family members or other similar, small data set.
3. Students should be shown how to calculate standard deviation using a scientific calculator. Again, the teacher may like to use Microsoft Teams or other video conferencing facilities such as skype or zoom to facilitate. Students should refer to the instruction manual for their calculator <https://bit.ly/3cRR62q>.
4. Students could use the open middle activity to practise calculating standard deviation.
5. Students could alternatively play ‘The dating game’ by calculating the standard deviation of their name to determine their perfect match.
 | What is standard deviation?<https://www.mathsisfun.com/data/standard-deviation.html>Students attempt this open middle activity <https://www.openmiddle.com/standard-deviation/>The dating game<https://people.richland.edu/james/ictcm/2001/dating/dating.html> |
| 2 | 1. Students research a data set of interest to them, and then calculate statistics including mean, mode, standard deviation, range, quartiles and inter-quartile range; e.g. local prices of recently sold houses or prices of a car they are interested in buying.
2. Teacher to then lead a discussion on possible causes for the variability between prices. The staff member may like to use Microsoft Teams or other video conferencing facilities such as skype or zoom to facilitate discourse.
 | Possible data sources<https://www.realestate.com.au/buy><https://www.carsales.com.au/><https://www.gumtree.com.au/> |
| 3 | 1. Students visit a website for a local sporting association and use data from the last season to determine “Who is the best player”. For example, students could visit the [Newcastle District Cricket Association](http://mycricket.cricket.com.au/common/pages/asphost.aspx?id=HBA&entityid=2975) website and visit the Hall of Fame section.
2. Students should construct arguments using statistics to justify their choice. The staff member may choose to allow students to present their findings to the rest of the class through video conferencing such as Microsoft Teams, Skype or Zoom, or students could record their response using Flipgrid
 | Students could use https://info.flipgrid.com/ to record their response to “Who is the best player?” |
| 4 | 1. Students to use the Scootle activity to investigate and describe the effect on the standard deviation of adding or changing data values in a data set.
2. Students could be given challenges to complete:
	* What happens if all scores go up by 1?
	* What happens if you add a large score?
	* What happens if you add a small score?
	* What happens if you add a score in the middle?
	* Find a data set with a standard deviation of 1.6
	* Keep the standard deviation the same but find a data set with a lower mean
 | Scootle<http://www.scootle.edu.au/ec/viewing/L10842/html/index.html> |