**Stage 1 Scientific Studies – Semester 1 Program 1**

**Kitchen Science Focus**

This program articulates with LAP 01

This is a 10-credit program for students intending to study Stage 1 Scientific Studies.

Number of lessons equivalent to 60 hrs per semester, including 25–30 hrs of practical activities.

| **Science Inquiry Skills** | **Possible contexts** | **Activities/teaching strategies** | **SHE** |
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| **Week 1** |
| **Scientific evidence, observations, and critical thinking** | Set up slices of bread in sealed plastic bags for making observations of decomposition (succession).  | Investigate ‘scientific claims’ in advertising.<http://www.businessinsider.com/false-advertising-scandals-2016-3/?r=AU&IR=T/#later-kellogg-said-mini-wheats-could-make-you-smarter-6><https://www.scientificamerican.com/podcast/episode/cosmetic-ads-science-claims-lack-foundation/> podcast/transcript<http://www.minyanville.com/business-news/editors-pick/articles/AAPL-SKX-TWX-nws-gci-dis/3/12/2012/id/37344> (kitchen/food examples)What sort of evidence would be required to support the claims? | Discuss claims made by scientist such as Galileo Feather and cannon ball), William McBride (Thalidomide).Consider scientific fraud <http://theconversation.com/tougher-action-needed-in-the-fight-against-scientific-fraud-68076> |
| **Week 2–3** |
| Deconstructing problems  | Discuss different ways of deconstructing a problem and presenting evidence of the deconstruction.Science Understanding - Microorganisms:* Structure
* Function
* Role
* Environmental requirements

(in preparation for summative investigation) | Students work in groups to deconstruct a range of problems. E.g. What is the most efficient way of cooking muffins? Can bicarbonate of soda be used to replace all cleaning products? Is the freezer in your fridge germ free? What type of milk makes the best yoghurt?What is the best/quickest way to decompose kitchen waste?Set up investigation: what plants can be re-grown from parts instead of throwing them out?E.g. https://www.education.com/science-fair/article/clone-plant/ | Huston, we have a problem.https://sites.google.com/a/cusd10.org/mrs-griggs/home/how-do-scientists-work-together |
| **Week 4–6** |
| Obtaining and representing evidence | Discuss essential components of a scientific investigation to provide measurable evidence including hypothesis, variable, equipment, method, data collection, safety.Practice sterile techniques to obtain evidence using agarDiscuss ways of recording data from agar plates<https://sciencing.com/count-colonies-microbiology-17859.html><https://www.youtube.com/watch?v=pHpMF9hvvh4><http://appslabs.com.au/counting%20bacteria%20colonies.htm> | Practical: Grow bacteria on agar plates – investigate factors that affect bacterial growth. Consider the effects of factors such as:* temperature
* nutrient availability
* moisture
* pH
* removal of wastes
* oxygen
* antibiotics/
* antiseptics

**Week 5** **Summative: SIS task**Students undertake an online task in which they interpret data, formulate and justify conclusions, evaluate investigation design, collect and represent data, and evaluate claims. | Discuss examples of scientists working together to obtain evidence. Use, for example, Cosmos, New Scientist.Investigate the Living Tattoo for sensing e.g. environmental changes. |
| **Week 7–8** |
| Representing and analysing data | Distinguish between qualitative and quantitative data, primary and secondary data.Consider different ways to represent data and when to choose each method. (table, different types of graph)Examine the misuse of data displays.https://qz.com/580859/the-most-misleading-charts-of-2015-fixed/ | Obtain and represent data to answer the question: How accurate is a kitchen timer?Kitchen thermometer**Week 7: Summative: Investigation Design**Design and conduct a practical investigation to test the ’10 second’ rule for food safety. | Discuss investigations into how many bacteria are in/on the human body.How is the data represented and analysed?How do scientists gather the data? |
| **Week 9–10** |
| Evaluation of procedures* random errors
* systematic errors
 | Science understanding - Acid/base chemistry, pH (in preparation for Collaborative Inquiry)Measuring pH using different devices to discuss random and systematic errors |  | **Week 10: Summative: SHE inquiry**Choose a new technique for managing wound sterility. Link to one of the SHE key concepts to prepare a report. |
| **Week 11–13** |
| **Collaborative Inquiry – group design** | Science Understanding - Mixtures, Solutions (preparation for Collaborative Inquiry) | **Beginning Week 12: Summative Task**Students work in groups to investigate using acids and bases to change the colour of drinks for a children’s party. They record their individual contribution and progress in a journal to reflect the deconstruction of the problem, development of the method. They also record the data collected and analyse it for meaning.After conducting the investigation, students individually prepare a presentation in the form of a pitch, defence, or justification that evaluates the procedures used and the results/outcome, and the effectiveness of the collaboration. |  |
| **Week 14–16** |
| **Conclusions*** **Justification**
* **Limitations**
 | Consider evidenceRecognise possibility of hypothesis being refutedConsider how widely the conclusion can be applied. Can it apply to the ‘real’ world?Develop new hypotheses as appropriate. |  |  |