

# Buffers in Hydroponics

## (C2 H2 Chem HBL)



### Lesson Description

A short powerpoint show was done to introduce students to hydroponics and the problems that Singapore is facing. Links were provided for students to read up more. Students are to take up a role of a research scientist (employee of a company - BuffALo) to investigate which of the unknown solutions (A, B and C) to be use to grow Cabbage, Tomato and Orchid by determining the pH of the solutions They have to submit a worksheet on how they match the unknown solutions to the crops (there is a help page which gives them the useful equations that they may need for their calculations of pH). The worksheet includes a challenging question as an extension of the main task. The worksheet also includes a section where students have to find an appropriate buffer system using the internet search engine.

The objectives of the HBL were:

- To revise on calculations of the pH of buffer solutions
- To revise on how buffer solutions work.
- To learn about the application of buffer solutions in hydroponics.
- To understand the agricultural industry in Singapore (to incorporate National Education into the activity where students will be able to understand how Singapore is moving into high-tech agricultural practices due to our limited land space and this task links what is learnt during lectures with real-life applications.)

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### Outcomes

- The HBL exercise helps students in their revision of buffer solutions (which they are very weak in). By marking the worksheets, tutors will be able to identify the common mistakes that the students make and will be able to address them in class.
- Allow students to see links between buffers and real-life applications. Most of them thought that buffers are just chemical reagents which do not serve any real purpose!
- To introduce the agricultural industry in Singapore to students – the 6 agrotechnology parks and how Singapore turns to high-tech agricultural industry due to limited land and the need to maximise output.

### **Feedback from Students:**

- Students have found that the task is useful for their revision (many realised that they could not even do simple calculations and that they need to revise their work!)
- They like the challenging question as it is not the normal type of questions in tutorials and require much thinking.
- The length of the task is just right - not too long