

SSERC Biology Summer School

by Stephen Watson

The Biology Summer School brought to us by SSERC was a phenomenal practical experience and an incredible opportunity to network with other practitioners. The programme was very well thought through allowing us to gain better understanding of conducting practical work across the biology curriculum both within the classroom and as outdoor learning. Special recognition should be given to Annie McRobbie in executing a flawless and smooth programme over the three days, especially with it being her first Summer School at SSERC.



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The budget within a science faculty must always be carefully considered when it comes to resources for the year ahead. During the Biology Summer School, microscale biology was a focal point. It was brilliant to see how to conduct practical work, such as catalase activity with hydrogen peroxide using simple drops on a wipeable board. It was a much quicker method, less glassware, thus less cleaning up and more importantly it avoids cognitive overload by focusing on the main fundamentals of the practical itself and the important theory behind the results.

Illustrating aerobic respiration is not always as clear, but using immobilised yeast, certain variables can be focused on and therefore used for potential projects. Immobilised yeast can be used alongside changing the sugar type, type of yeast used and the temperature the investigation is exposed to. Using the immobilised yeast to see the effects of aerobic respiration, further skills can be developed by using colorimeters and resazurin dye. Colorimeters can be useful tools for more than aerobic respiration practical work as they can also be used to identify enzyme

inhibition. Using beta-galactosidase, ONPG and galactose, the presence of a competitive inhibitor can become more obvious than some other practical work that is completed within Higher Biology investigations. Colorimeters can be borrowed from SSERC on request.

Continuing with glucose, there was focus on qualitative studies. Using potassium permanganate and different concentrations of glucose, the time taken for the permanganate to lose colour is directly correlated to the concentration of glucose. From this a standard curve can be presented and therefore three unknown glucose concentrations can be estimated from this curve. This is important for our learners as not only does it allow them to develop further skills, especially since said skills can be used in exam style questions, where interpreting data from graphs can be somewhat challenging.

Ever since the introduction of the micro:bits into schools, I have never really been aware of what to do with them. In my school we use them in the science faculty for a very brief area of a physics topic, but beyond that I was not sure how to implement them. Being able to see how many different ways micro:bits can be used in the classroom was >>



Ecology study on Pitreavie Playing Fields.

Activities & professional learning

astonishing. Coding and technology is at the forefront of society and allowing learners to be exposed to interdisciplinary learning through the use of these micro:bits is a brilliant experience to have in school. The micro:bits can be programmed and coded by the learners themselves, or done prior to a lesson, but then can be used in a very simple way as a light meter. In schools I believe there needs to be more of a link between other subjects as a lot of the time learners do not realise the interconnections between everything they do.

Further to sampling, learners throughout the biology curriculum need to understand the importance of randomised investigations. Through the Exploring the World session, Annie shared with us a very simple way of randomising the identification of plant species using a quadrat; using a random number generator to identify coordinates in a specific area of a field. Moreover, I would be naïve to think that the quadrat could only really be used to identify the abundance of different plant species in each area. I never thought to ever do a comparison between grass that has recently been mown versus unmown to identify species diversity.

As stated, technology is at the forefront of society and should be used more often in the classroom when appropriate. When it comes to identifying the rate of photosynthesis, pond weed and counting oxygen bubbles seems to be the go-to investigation. This practical is brilliant to show that oxygen released at different light intensity levels changes, but it relies solely on the learners conducting the



Microscale experiments.

investigation. Through the use of a carbon dioxide sensor connected up to the Go!Link software on a laptop, inserting it into a respiration chamber with basil leaves, the rate of carbon dioxide consumption can be calculated and immediately plotted on an electronic graph. The reliability of these results are higher than that of counting oxygen bubbles and also allows for the learners to conduct the investigation over a greater period of time as it can be left to be completed on its own. Using neutral density filters, this can also demonstrate that light intensity is an important factor for the process of photosynthesis.

SSERC staff are not the only individuals who made this experience so worthwhile. Further special recognition should also be given to Paul Beaumont, Erin Cowley and Douglas McDonald for their guest sessions. The guest sessions allowed us to see that learners need to be more aware of reliability of sources of information, how to link current diseases, such as motor

neuron disease within the biology curriculum and that there are vampires among us. (I will leave that one to your imagination).

After experiencing the Biology Summer School, I can now confidently trial the practical work focused on throughout the programme to give my learners a better experience whilst undergoing their Higher Biology. It is also one of the best ways to network with other members of the biology teacher community, as well as staff at SSERC, such as Annie McRobbie and Margaret Louis who did a fantastic job pulling off such a successful programme of events.

This opportunity comes up every year and always takes place in June at SSERC in Dunfermline. When you see this programme advertised, I would highly recommend you sign up for it as it will change the way you do things within your classroom, for the better. >>