

**Bioblocks: building with nature
Swansea, Wales, UK**

Tidal Lagoon Swansea Bay & SEACAMS2 (Swansea University)

BIG Biodiversity Challenge Award category: Community Engagement Award

Project overview

SEACAMS2 and Tidal Lagoon Swansea Bay Plc have worked together to explore opportunities to enhance the ecological value of the worlds' first tidal lagoon in Swansea Bay. The tidal lagoon involves the building of a U-shaped 9.5km breakwater providing a new coastal infrastructure in Swansea Bay. Research has looked at materials and textures that could be used for the wall construction to encourage marine life.

A Bioblocks workshop was held at Oriol Science, Swansea, in February 2017. It was jointly funded and involved over 200 children who used cubes of clay to sculpt ecologically attractive habitats for coastal creatures. These 'bioblocks' demonstrate how marine life can adapt to manmade structures while children and their families gained a better understanding of the unique resilience of sea creatures, marine biology and the lagoon project.

What were the biodiversity conditions on site, prior to the enhancement?

The biodiversity of Swansea Bay is typical for sandy, shallow seafloors at rocky coastlines. The tidal lagoon will add hard substratum and may compromise features such as a honeycomb worm reef. Adding biodiversity enhancing materials mimicking rocky shore surfaces with ridges, grooves and overhangs will promote colonisation and enrich biodiversity.



Bioblocks workshop at Oriol Science, Swansea (photos R. Callaway)

Were there any specific reasons that led to this project?

Both TLSB and SEACAMS2 are keen to discuss biodiversity with community organisations. Constructing an infrastructure project in an environment that people value and enjoy demands communicating the pros and cons, and we feel responsible for providing information about the general ecological principles which drive the impact as well as specific facts about the project. Biodiversity enhancing is a planning condition and this workshop allowed us to communicate the rationale behind proposed measures. It also allowed us to better understand concerns of the community. The creative solutions by the children (and their guardians) was an inspiration for future biodiversity enhancement designs.

What were the biodiversity measures taken?

Tidal Lagoon Swansea Bay (TLSB) is considering the inclusion of biodiversity enhancing 'bioblocks' in the actual lagoon wall. A 'bioblock' is an artificial reef that can be used as construction material in the marine environment for any infrastructure project, for example for coastal flood defences. Bioblocks are specially designed to encourage marine animals to live on or in it. Marine animals can utilise a lot of different features. They need shelter from pounding waves, ripping currents or predators. A lot of seashore animals, such as mussels, limpets or barnacles need to cling onto rocky material, and they need a firm grip when the sea gets rough. A diverse and complex habitat will enable more species to use this new material as a living space: crevices and holes will provide shelter, variable surface textures will allow animals and seaweed to attach. Bioblocks can have a range of features, such as grooves, holes or overhangs. These are all important features that can provide shelter, hold water or provide a foothold for an animal to hide and live in.



Bioblocks workshop at Oriol Science, Swansea (photos R. Callaway)

For this workshop we used 300g blocks of clay for children to create and explore possible features. These were models for the potential real bioblocks or artificial reefs that could be used for the tidal lagoon, which may eventually be constructed from specialist concrete and recycled materials, such as oyster or mussel shells.

During the workshop 14 staff from the SEACAMS2 project and TLSB volunteered for the 9 day workshop having received a thorough brief on the objective of the workshops. The event was held at Oriol Science, an initiative by the College of Science at Swansea University showcasing science in the community. The bioblocks workshop was supported by the Oriol Science management and exhibition and public engagement staff.

How would you best describe the project?

Enhancement

Further information

The bioblocks workshop in February 2017 was developed from a pilot event at the British Science Festival Family weekend in Swansea in September 2016. The mixture of formal biodiversity information through posters and leaflets, the opportunity for children to craft a bioblock and staff happy to discuss the tidal lagoon development with the families proved a successful format. Children had been keen to take home their bioblock creations, but for the February workshop we aspired to assemble a large mosaic of all clay blocks to further illustrate the potential of constructing rich-structured habitat. The incentive to leave us their bioblock was a joint submission to this year's 'Research as Art' competition at Swansea University, which proved to be popular. The competition image and the actual mosaic will be displayed at the next Oriel Science exhibition, and the children who contributed will be credited by name.

The workshop was a very effective way of teaching biodiversity and enhancement measures to children of all ages in an interesting and practical way, and it allowed them to experience biodiversity through a new approach. As a result we had subsequent interest from a number of local and wider schools. Further, we were invited to contribute to the 2017 Science Festival. The success of the workshop inspired us to consider events where children and their families could contribute to building and monitoring actual bioblocks used in the coastal environment.



Display created by compiling children's bioblocks made at the workshops (photo R.Callaway)

What was your personal motivation for carrying out the enhancement?

That younger generations of the Swansea Bay region understand the different complexities of the lagoon and feel included in its development. The workshop allowed for complex issues to be broken down in a way that children could understand and interpret themselves through the medium of clay.