Climate Control



AN ACTIVITY TO DO AFTER VISITING GEELONG BOTANIC GARDENS

When we talk of 'Climate controlled spaces' people tend to think of advanced technologies, internet enabled sensors and smart greenhouses.

But people have been altering the microclimate around their preferred plants for a very, very long time! Thousands of years ago when the first rice terraces were shaped to hold water for the optimal number of weeks (conveniently providing people with a pool in which to grow edible eels and ducks, too) - they were practising a form of microclimate control. They knew that by providing perfect conditions to suit the needs of the rice plant, they would get a better (more convenient) harvest. And duck eggs too.

After seeing the Wardian case in the Geelong Botanic Gardens collection, and perhaps experiencing the warm humidity of the Conservatory or the cool depths of the Fernery, this lesson sets students the challenge of designing a built solution such as their own case that will cater for the specific needs of a group of plants or fungi of their choice, whether that's tulips or toadstools, turnips or titree.



Victorian Curriculum Links:
Level 3, Level 4 - Design & Technologies: VCDSCD028
Level 3, Level 4 - Science: VCSSU056, VCSSU058
Level 5, Level 6 - Science: VCSSU073, VCSSU075

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resources

Climate controlled designs

- Learn about the many ways you could make a mini greenhouse from recycled or free materials, with the permaculture farmers at Milkwood: Make a Mini Greenhouse
- ABC Gardening Australia - How to Build a Cold Frame (video)
- ABC Gardening Australia - A Simple Shelter for Plants (video)
- Permaculture UK has a pattern to show you how to build a self-opening cold frame
- Monash University's Internet of Things Kitchen Garden program has a unit about creating data-driven climate-controlled mini-greenhouses. The resources can be found here at IOTKG.org and specifically this unit: Climate, Level 2
- Intrigued by rice terraces? Read about the ancient Banaue rice terraces of the Philippines.



directions

- Look at some of the examples of plant collectors and their contributions to scientific knowledge of specific species or regions of the world.
- Bring students' attention to the way a plant hunter might specialise in lichen, or fungi, orchids, bog plants or alpine plants.
- Direct students through a design project to devise a case that suits one specific type of plants (or fungi) they have chosen to 'collect'.
- Ensure they research the needs of these organisms, and have them design and propose a solution that will maintain these conditions. Prompt them to consider these needs of plants: light/shade, soil moisture, soil and air temperature, and soil aeration (air).
- Students create a design for their microclimate case and propose the materials to build it.
- They can build their own cases, or, if the real thing would be too large, a scale model of their proposed design.
- Designs might even include simple robotics components such as actuators and arduinos that open or close flaps, or IoT sensors that sound alarms when conditions are compromised. (See IoTKG resource at left for advice and resources on this data / engineering angle if desired.)