

A Desert Landscape Instructions and Answer Sheet for Teachers

Gardens by the Bay Avatar:

- Landscape Designer

Level/ Subject(s):

- Upper Secondary/ Science, Art

Learning Objectives:

- Understand the climatic characteristics of the semi-arid sub-tropical regions of the world
- Describe the features and adaptations of desert vegetation
- Learn how a garden can be designed to showcase a specific collection of plants

Activity 1 - Aloes in Wonderland



Succulent Garden, Flower Dome

The Succulent Garden is presented as *Aloes in Wonderland*, inspired by the novel *Alice's Adventures in Wonderland* by Lewis Carroll.

Why do you think the landscape designer who put this garden together chose this as a theme, and how did the designer relay this theme to visitors? Think about the novel and what it portrays. You may also refer to the images of the Succulent Garden provided above. Pen down your thoughts in the box below.

The landscape designer probably chose *Alice's Adventures in Wonderland* as a reference for its portrayal of a fantasy world. The Succulent Garden is therefore transformed into a magical, fantastical land where visitors can go on an adventure and see all kinds of interesting-looking plants.

To relay this theme to visitors, the designer included sculptures of characters found in the novel, such as Alice and the caterpillar, in the display. There are also sculptures of mushrooms, which are featured in the novel. Succulents, ranging in form, shape and colour, have also been used to form more "mushrooms".

Activity 2 – Arid Adaptations

Fill in the table below, capturing what you have learnt about the adaptations of the three plants you've seen. After doing so, consider how the Organ Pipe Cactus and Lithops are displayed in the Succulent Garden, and how this highlights their adaptations. Then, fill in the right most column in the table.

Adaptation	Plant	How the Adaptation Works	How the Plant Display Highlights its Adaptation
Getting/storing water	Organ Pipe Cactus	Its long and shallow roots quickly absorb rainwater and the pleats on the surface of the cactus allow it to expand, to hold the water. The pleats also cast shadows on the plant to keep the plant cool and minimise water loss.	The Organ Pipe Cactus is supported by trusses, reflecting its instability due to its shallow roots.
Conserving water	Desert Rose	During dry spells, the plant drops its leaves to prevent loss of water through transpiration. It has a photosynthetic stem, which allows it to make food for itself even when it loses its leaves.	
Protection through mimicry	Lithops	During dry periods, Lithops allow their old leaves to dry up as they enter a stage of dormancy. When dormant, they look like stones or small pieces of rock and are virtually indistinguishable from their surroundings, making them both 'invisible' and unattractive to thirsty animals. When the rains do eventually come, they spring back to life, shedding their old leaves and sometimes even flower.	The Lithops are displayed right next to stones and small rocks, highlighting how they camouflage themselves in these surroundings to avoid being eaten by predators.

Activity 3 – A Desert Landscape for Kids

We have examined the Succulent Garden in Flower Dome, and seen how the display helps to highlight the characteristics of the plants it houses. Imagine that Gardens by the Bay is planning to open a succulent garden for kids in the Far East Organisation Children’s Garden. How would you design your desert landscape for kids?

As a landscape designer, you will need to consider the target audience and their needs before you begin work on your garden design. Make notes below for each of the points given.

Points to Note	
Visibility of plants	Since the garden is for kids, the plants should be placed at an appropriate eye level where they will be able to see them easily.
Safety of visitors	Succulents may have spines that can be dangerous to kids. Glass panels should be put up to prevent kids from touching the plants, yet allow them to have a clear view of the display.
Appeal of display	Interesting-looking succulents should be displayed to grab the attention of kids. Attractive-looking props can also be included to brighten the display and make it more appealing to them.
Visitor engagement	As part of the display, interactive elements can be incorporated to engage kids. These may include tactile interpretation boards, audio visual clips, or even scents that can capture their senses.

The above is an open-ended question. Accept any sensible response that addresses the points listed.