

A Desert Landscape Sharing and Activity Sheet for Students

Gardens by the Bay Avatar:

- Landscape Designer

Level/ Subject(s):

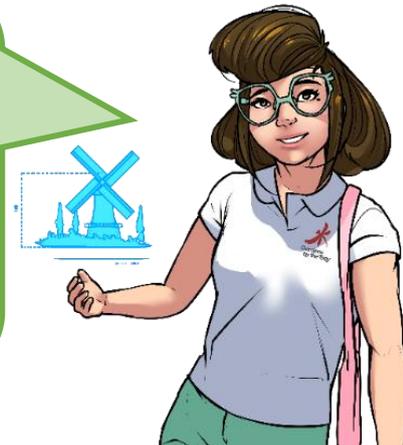
- Upper Secondary/ Science, Art

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

Hello students! My name is Liza. I'm a landscape designer and I've been working at Gardens by the Bay for 6 years!

Today I'll be sharing with you the climatic characteristics of the semi-arid sub-tropical regions of the world and the features and adaptations of desert vegetation to help you see how a garden can be designed to showcase a specific collection of plants. Let's begin!



Welcome to the Succulent Garden in Flower Dome, where you will get the opportunity to venture into a desert landscape and learn more about the plants that thrive in such an environment. This is where our sharing will take place.





Succulent Garden, Flower Dome

Activity 1 - Aloes in Wonderland

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.

A Desert Environment

Succulents live in deserts and have three main adaptations:

- Getting and storing water
- Conserving water
- Protection

They have developed these adaptations to survive in very harsh habitats. Temperature extremes are characteristic of most deserts. In the day, it can be as high as 50°C and may drop below 0°C at night. This is because there is no insulation provided by humidity and cloud cover. However, contrary to what many people think, water can be found in deserts. They often come in the form of seasonal rains or passing mist.

Let us take a look at three plants that are found in the desert, and their adaptations.

Organ Pipe Cactus



Organ Pipe Cactus

The Organ Pipe Cactus is native to Mexico and to southern Arizona in the United States, where it is extremely hot and dry. It has long and shallow roots that grow laterally, rather than deeply or vertically downwards. This allows the plant to spread its roots as far as possible and quickly absorb rainwater or any moisture that falls onto the ground around it. The Organ Pipe Cactus in Flower Dome is supported by trusses as it is unstable due to its shallow roots.

In addition, the plant has pleats on its surface. These allow it to expand to hold and store water during rare times of rain, and serve to cast shadows on the plant, shading it to keep the plant cool, and in turn minimising water loss.

Desert Rose



Desert Rose

Let us take a look at our next plant, the Desert Rose!

The Desert Rose is native to parts of the African continent and to West Asia. One of the places you can find it is on an island called Socotra.

On the dry, rocky cliffs of the island, the Desert Rose grows out of the crags. Its fat trunk/ stem is like a reservoir in the desert, storing water for the plant throughout the year. It is also an expert at conserving water. During dry spells, the plant drops its leaves to prevent loss of water through transpiration. Even without leaves, it is able to make food

for itself as it has a photosynthetic stem (a stem with chlorophyll and can photosynthesise).



Desert Rose on Socotra Island

Now that we have seen how succulents get/ store and conserve water, we will look at how they protect themselves.

Lithops

In places like deserts, where water is hard to come by, survival is a struggle not just for plants but animals as well. So, it is imperative that succulents protect themselves from thirsty predators. One of the obvious ways that some succulents do so is to sport spines that will deter most animals.

Some succulents resort to another means – mimicry. Look at the Lithops collection in the image below. Can you distinguish the plants from the surrounding stones?



Lithops

Native to South Africa and Namibia, this plant may be found growing in small populations from sea level to the high mountains. You will find it covering small areas on dry grassland and even on bare rock. Like most succulents, it grows in extremely dry climates that see an inch or two of rain annually.

Did You Know?

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. This makes them both 'invisible' and unattractive to thirsty animals. When the rains eventually come, they spring back to life, shedding their old leaves and sometimes even flower.

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
	Organ Pipe Cactus		
	Desert Rose		
	Lithops		

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	
Safety of visitors	
Appeal of display	
Visitor engagement	

We’ve come to the end of our sharing today! I hope you’ve enjoyed learning about succulents, and how a garden can be designed to showcase a specific collection of plants. I hope to see you at the Gardens again soon!

