



ACTIVITY NOTES

WATERWORKS



7 to 12 years old



10 - 15 minutes

Includes:

Teacher Notes

Student Worksheet



EXPO
CITY
DUBAI



TEACHER NOTES



LESSON SUMMARY

Water conservation and filtration systems continue to be an important topic to be explored. Based on the workshop 'WaterWorks', this learning resource checks students understanding from the workshop of how the Terra Pavilion uses a closed-loop system to recycle water in order to achieve a target of net-zero water consumption. desalination, as well as some natural examples of water desalination in the UAE.



EXPO CITY DUBAI CONNECTION

Expo is committed to achieving net zero water consumption. This is both to reduce pressure on already vulnerable fresh water stocks as well as the dependency on desalination. To do this has two goals:

- To achieve net-zero water use
- To consume 40% less water than the regional average

These are ambitious goals. While Expo is located in an arid landscape with little water, it requires a lot of water to run. At the Terra Pavilion, water is involved in everything from cooling the building to preparing food, and watering the gardens - not to mention supplying enough drinking and bathroom water everyone who visits each day.

Terra's aim is to make sure that as little of this water as possible comes from Dubai's main drinking water supplies, and therefore water is captured, cleaned and recycled all over the Pavilion. Depending on where the water comes from and how it is used, its quality varies, so Terra has a number of different systems for cleaning and reusing water.



LEARNING OBJECTIVES

- Understand how the Terra Pavilion recycles waste water to achieve net-zero water consumption
- Appreciate the environmental impact of industrial water desalination and some natural methods of water desalination



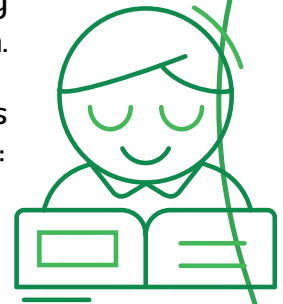
MATERIALS/ RESOURCES REQUIRED

- Student Worksheet

ACTIVITY OVERVIEW

Before beginning the activity, students should have recently completed the 'WaterWorks' workshop at Expo City Dubai. Students should be reminded that the Terra Pavilion at Expo City recycles its waste water using a variety of filters, including the natural reed bed that surrounds the pavilion.

After studying the diagram of water flow around the pavilion, students should use the word box to complete the missing words in the paragraph:



SOLUTION:

When someone flushes the toilet, the **waste** water is recycled by Expo City. It first passes through a mesh screen which filters out **large** particles and **solid** waste. The remaining water then passes through **reed** beds which surrounds the pavilion.

Gravel and sand in the reed beds act as a natural filter while **algae** and roots absorb other things in the water, even soap particles.

The filtered water is then sterilised to **kill** unwanted germs before the water is pumped back into the pavilion to be used again. This helps Expo work towards achieving its goal of **net-zero** water use.

Desalination:

Students read the passage on water desalination. The teacher may also wish to show a video about water desalination [Water Desalination Video](#) before students suggest three reasons why we should reduce our demand on desalinated water. Some answers could be:

- Needs a lot of energy
- Requires the burning of fossil fuels to generate the energy needed (and adds greenhouse gasses into the atmosphere)
- Waste salt is put back into the sea and sinks to the ground, damaging marine life
- Waste salt increases the saltiness of the sea which could kill marine life
- Other pollutants could go into the sea as well as waste salt
- Marine life could be killed in the process of extracting the water from the sea
- Large factories can destroy habitats for wildlife that live near the beach or in the sand



DID YOU KNOW?

Mangroves are the only tree which can live in salt water and naturally desalinate water to make fresh water for the tree to use. They are also useful for protecting coastlines, absorbing CO₂ from the atmosphere and filtering waste water. Students could be given an activity to find out more, or simply read the following news articles.

[MOCCA News | Media Center | UAE Ministry of Climate Change and Environment \[UAE Announces Enhanced Target to Plan 100 Million Mangroves by 2030\]](#)

[Why the UAE's mangroves are so important — and how to save them \(thenationalnews.com\)](#)

[Device inspired by mangroves could help clear up flood water | Science | The Guardian](#)