

Generate drinkable water from seawater using a desalination system

Introduction

Seawater contains dissolved salts at concentrations between 32 and 37.5 parts per thousand. That means that if you started with one kilogram of seawater (which is approximately one liter of seawater) and then you allowed all of the water to evaporate, you would be left with between 32 and 37.5 grams of salts (also called "total dissolved solids").

With all of that salt, seawater is not suitable for drinking nor for watering most plants. The fluid circulating in the body (blood plasma) contains much less salt than seawater (on the order of 9 grams of total dissolved solids). If you were to drink seawater, your body would actually lose water, because the high salt concentration of the seawater causes an *osmotic pressure gradient* which drives water out of your cells.

Desalination is the process of removing the dissolved salts from water, making it **pure** enough for drinking or irrigation.

Hence, this environmental engineering science project will focus on how seawater from the oceans can be turned into fresh water that is suitable for people to drink. In this project, a solar desalination apparatus will be constructed using readily available materials, and solar power, which is a power source that is free.

Light-colored materials **reflect** more light than dark-colored materials, which **absorbs** a lot of the light that hits it. Light is a form of *energy* and energy can be transferred to nearby objects (such as a body of water) in the form of heat, through a process known as **heat transfer**. Thus how the color of the bottom of the device affects its efficiency will also be investigated.

Objectives

Build and test a solar-powered device for desalinating water. Investigate how the color of the bottom of the device affects its efficiency.

Terms and Concepts that will be covered

- Solar-powered devices
- Desalination
- Water purity
- Evaporation
- Water vapor
- Condensation
- Surface area
- Yield
- Reflection of light
- Absorption of light
- Heat transfer

References

1. <https://www.youtube.com/watch?v=YFwNFy535Go>
2. http://www.sciencebuddies.org/science-fair/projects/project_ideas/Energy_p002.shtml