



Desalination

STEM Sims

Lesson 2: Temperature Gradient

What is the optimal choice of warm and cold water intake depths to gain the maximum amount of fresh desalinated water?

Doing the Science

- 1. Start the Desalination Simulation.
- 2. Select “Surface” for Warm Water Intake Depth and “Surface” for Cold Water Intake Depth, and then select “Continue.”
- 3. Connect all of the pipes and pumps properly. You discovered the right answers by trial-and-error experimentation in Lesson 1.
- 4. Select “Start” and record in Table 1 below the liters/hr measurement in the Surface/Surface table cell.

Table 1. Water Depth and Plant Output

Cold Water	Warm Water					
		Surface	100 m	200 m	300 m	400 m
	Surface					
	100 m					
	200 m					
	300 m					
	400 m					

- 5. Do *not* exit from the program. Select “Reset Depths.”
- 6. You will be returned to the main screen. Choose a new combination of intake depths to test, and then select “Continue.”
- 7. Repeat steps 4-6 until you have completed Table 1.

What Do You Understand?

- 1. Describe the difference between a temperature and a temperature gradient.

2. Why is ocean water described as having a temperature gradient?

3. What is the primary cause of the ocean water's temperature gradient?

4. What is the optimum combination of water intake depths to make the most fresh water?

5. On your own paper, create a graph of warm surface water only versus the cold water at the various depths. Describe the shape of your graph.

6. Predict what the liters/hr amount would have been if the warm water was collected at the surface and the cold water was collected at 500 m. Describe how you arrived at your prediction.
