Name_____ Date _____

Trench Dive

STEM Sims

Lesson 1: Trench Measurement

Unfortunately, at certain depths under the ocean it becomes difficult for gauges to give accurate readings. Therefore, as scientists, we have to make predictions based on patterns and trends. Can you solve the problem of the broken depth gauge and determine the depth of the ocean trench?

Here are some definitions to help you in your investigation.

Depth – the distance from the current position to the water's surface. This quantity is measured in units of meters (m).

Water density – the mass of water divided by the volume of water. This quantity is measured in units of grams per cubic centimeter (g/cm^3).

Temperature – a measure of the hotness or coldness of the water. This quantity is measured in units of degrees Celsius (°C).

Pressure – the amount of force of the water per unit area. This quantity is measured in units of newtons/square centimeter (N/cm^2).

Salinity – the amount of salt dissolved in water. This quantity is measured in units of practical salinity units (psu).

Doing the Science

1. Start the Trench Dive Simulation by clicking on the "Sim" tab.

2. Click the blue "All" button to sample all variables at the surface. Note and record the Water Density, Temperature, Pressure, and Salinity data in Table 1.

3. Using the green dive button on the left side of the screen, dive your submersible to 1,000 m.

4. Repeat Step 2. Make sure to record your data in Table 1.

5. Dive your submersible to 2,000 m and repeat Step 2.

6. Dive your submersible to 2,980 m and repeat Step 2. Please note that at a depth of 3,000 your depth gauge will break.

7. Continue diving your submersible, collecting samples about every 500 meters, and recording data even when the submersible disappears. You'll have to estimate how long you hold down the green down arrow to reach each 500 meter interval. When your data stops changing from one measurement to the next, your submersible has reached the bottom of the trench. Make sure to record your data in Table 1.

Table 1.

Depth (m)	0	1,000	2,000	2,980	---	---	---	---	---
Water Density (g/cm^3)									
Temperature (°C)									
Pressure (N/cm^2)									
Salinity (psu)									

Do You Understand?

1. In the simulation, click on the blue "Graph" button. Next, click through each of the four variable buttons (Water Density, Temperature, Pressure, and Salinity) and review each graph. Which variable's graph is a straight line?

2. With the variable you identified in question 1, what is the relationship between that variable and depth?

3. Calculate the depth of the bottom of the trench based on your pattern and enter it below.

Trench depth = _____ meters

Return to the simulation screen by clicking the yellow "Data" button. Click on the "Trench Depth" button and enter your estimate. Were you correct?