Name_____ Period _____ Date _____

Trench Dive

STEM Sims

Lesson 2: Does the Temperature of Ocean Water Change with Depth?

Have you ever gone into a pool, lake, or the ocean and thought the water was too cold to swim? Rarely do people go swimming down below a few meters from the surface of the water. What do you think the temperature is at spots really deep in the ocean? Prepare to plunge into this investigation.

Here are some definitions to help you in your investigation.

Distance -	a measure of the length of something
Meters -	a unit of measure of depth. One meter is about 3 feet.
Depth -	the distance from the top or surface of something to the bottom of something
Temperature -	a measure of the hotness or coldness of something
Celsius (°C) -	a unit for measuring temperature. Room temperature is about 25 °C.
Trench -	a very low point in the bottom of the ocean
Prediction -	a statement about a future event, often based on experience
Prediction Error -	how far a predicted measurement is from the true or actual measurement

Doing the Science

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

2. Click on the "Temperature" button to sample the temperature at the surface. Record the data in Table 1.

3. Next, click the green down arrow on the left side of the screen until the depth measurement reaches 100 m.

4. Click on the "Temperature" button to take another sample of the temperature at 100 m. Make sure to record your data in Table 1.

5. Repeat steps 3 and 4 in increments of 100 m until you complete Table 1.

Table 1.

Depth (m)	0	100	200	300	400	500	600	700	800	900	1,000
Temperature (°C)											

Do You Understand?

1. In the simulation, click on the blue "Graph" button. Next, click the "Temperature" button. Review the graph and then describe the shape of the temperature graph.

2. Why do you think the water temperature changed with a changing ocean depth?

3. In the United States, most people talk about temperature in units called degrees Fahrenheit (°F). The freezing point of water in °F is 32 °F and the boiling point of water is 212 °F. Using the Celsius scale, the freezing point of water is 0 °C and the boiling point of water is 100 °C. Propose one reason why the rest of the world and scientists use the Celsius scale instead of the Fahrenheit scale.

4. Using your data, make a prediction on the temperature of the water at a depth of 1,400 meters. Write your prediction in the space below.

   Prediction of temperature at a depth of 1,400 meters = _____

5. After you write down your prediction, use the simulation to take a temperature reading at a depth of 1,400 meters. Write down the actual temperature in the space below.

   Actual water temperature at a depth of 1,400 meters = _____

6. Subtract your predicted water temperature at the depth of 1,400 meters from the actual water temperature. This is the error of your prediction. Write down your prediction error in the space below.

   Prediction error = _____

7. A student made a prediction that at the depth 1,400 meters the liquid water's temperature would have been -10 °C. In one sentence, state whether this student made a good prediction of the water's temperature.

8. A common saying is that people "learn by their mistakes." With that in mind, make a prediction of the water temperature at a depth of 2,000 meters. Find the prediction error.

   Prediction error = _____

9. Was your prediction for water temperature at the 2,000-meter depth better than your prediction at the 1,400-meter depth? Did you learn by your mistakes?