Mapping the Ocean Floor Practice

Name: _____

Read the information below and use the data table to answer the questions that follow. Staple your graph paper to the back of the practice worksheet.

In this activity, you will learn how scientists use math to find out about the ocean floor. The data in the table below represents various measurements of the depth of the Atlantic Ocean between Cape May, New Jersey and Cape Roca, Portugal. You will use this data to construct a *__PROFILE__* (topographical landscape) of the floor of the Atlantic Ocean between these points. You will need a pencil, a ruler, and graph paper. *Questions 1-3 will help you construct an appropriate graph.* Once your graph is completed, use it to help answer the remaining questions.

Distance From Cape May (*miles*)	Ocean Depth (*fathoms*)	Distance from Cape May (*miles*)	Ocean Depth (*fathoms*)
1. 0 (Cape May)	0	16. 2,200	1,150
2. 100	100	17. 2,225	750
3. 125	1,000	18. 2,325	700
4. 325	2,000	19. 2,450	550
5. 475	2,500	20. 2,475	0
6. 650	3,000	21. 2,525	1,000
7. 900	2,800	22. 2,700	2,000
8. 1,125		23. 2,725	
9. 1,300	3,125	24. 2,800	2,800
10. 1,425	2,900	25. 3,150	2,700
11. 1,475	2,000	26. 3,300	2,300
12. 1,600	1,600	27. 3,400	
13. 1,900	2,500	28. 3,425	500
14. 2,000	2,100	29. 3,475	100
15. 2,100	1,800	30. 3,500 (Portugal)	0

1. The ocean depths in the table are measured in *fathoms*, **where 1 fathom = 6 feet.**

    a. What is the **minimum** ocean depth in the table? *(Do not include sea level depth)*

        i. Measured in fathoms = _____   Measured in feet = _____

    b. What is the **maximum** ocean depth in the table?

        i. Measured in fathoms = _____   Measured in feet = _____

    c. **What does the maximum depth represent?**

2. What is the **maximum** ocean depth between New Jersey and Portugal in feet? In miles? *(Hint: one mile = 5,280 ft)*

    a. Measured in feet = _____   Measured in miles = _____

3. Notice that the data for ocean depth at a distance of 2,725 miles is missing from the table. *__ESTIMATE__* the depth at this point *(in fathoms)* and add your estimate to the data table above.

    a. **Explain the reasoning behind __EACH__ of your estimations:**

4. **ON THE FIRST GRAPH PAPER**, construct a **LINE GRAPH** of the depth of the ocean floor, with **ocean depth as the vertical axis (y-axis)** and **distance between New Jersey and Portugal as the horizontal axis (x-axis)**. Make sure you **label the axes with titles**, as well as **give a title for the overall graph**.

5. Carefully consider what intervals you will use for each axis and where sea level *(O fathoms)* should be located. Once graph is completed, **write a brief description of observations of the graph, noting in particular any significant changes in depth.**

6. One of the points in the graph represents an **ISLAND**. Which point do you think this is? **EXPLAIN your reasoning.**

7. The longest mountain range on Earth runs underwater, stretching nearly 80,000 km through all of Earth's oceans. In the Atlantic Ocean, this mountain range is called the **MID-ATLANTIC RIDGE**.

   a. **LOCATE AND <u>LABEL</u> THIS FEATURE ON YOUR GRAPH!**

8. The Marianas Trench in the South Pacific is the deepest known region of any ocean at about **36,200 feet** deep. **How much deeper is the Mariana Trench than the deepest point between New Jersey and Portugal?**

9. **ON THE SECOND GRAPH**, construct a **BAR GRAPH** comparing the depth of the Marianas Trench with the height or depth of the following features: *(Use positive numbers for all heights/depths).***Be sure to label each feature.**

   i. Mt. Everest (29,035 feet)
   ii. Grand Canyon (6,000 feet)
   iii. Empire State Building (1,472 feet, including the TV antenna on top)

10. Oceanographers measure the depth of the deep ocean using **SONAR**, a technology originally invented to detect submarines. Sonar equipment aboard a ship sends out sound waves, which bounce off the ocean floor and return to the ship. *The longer the time interval for the waves to return, the deeper is the ocean floor at that point.*

    a. Oceanographers use the formula: **D = ½ v * t**, *where "D" is the ocean depth, "v" is the speed of sound in water (5,806 ft/sec), and "t" is for the time interval (seconds) between sending and receiving the sound waves.*

    Use this formula to complete the table below of sonar data for (2) locations, rounding to nearest whole number.

Distance from Cape May (*miles*)	Time Interval (*seconds*)	Ocean Depth (*feet*)	Ocean Depth (*fathoms*)
1,125	6.00		
3,400	2.07		

11. **Explain why the sonar equation above includes the fraction ½ .** *(Hint: The standard formula for velocity is v = d/t, where d is distance and t is time. This can be rearranged as d = v*t).*