Name_____ Date _____

Chapter 6

Performance Task (continued)

Measuring Natural Disasters

In 2005, an earthquake measuring 4.1 on the Richter scale barely shook the city of Ocotillo, California, leaving virtually no damage. But in 1906, an earthquake with an estimated 8.2 on the same scale devastated the city of San Francisco. Does twice the measurement on the Richter scale mean twice the intensity of the earthquake?

In 1935, Charles Richter developed a method to compare the strength of earthquakes. Seismographs could already detect and record seismic waves. Richter's scale was a way to make sense of these measurements. A major challenge of such a scale was how to represent signals with such an enormous difference in intensity—the largest signals could be over one billion times greater than the smallest ones. The solution was to use a logarithmic scale. In a linear scale, units along the x-axis increase by a constant, usually 1. But in a log scale, units along the x-axis increase by powers of 10. An increase of 1 point means the strength of the earthquake is 10^1 times greater than the level before. An increase of 2 points means the strength of the earthquake is 10^2, or 100 times greater.

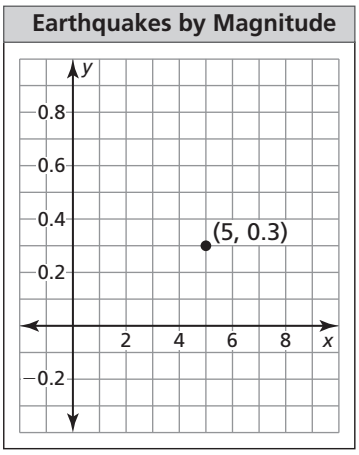
Earthquakes In Chronological Order[1]

Date	Location	Magnitude
April 18, 1906	San Francisco, California	8.2
March 28, 1964	Prince William Sound, Alaska	9.2
September 7, 1999	Athens, Greece	5.9
April 29, 2003	Fort Payne, Alabama	4.6
March 30, 2005	Fukuoka, Japan	6.6
May 20, 2005	Ocotillo Wells, California	4.1
December 16, 2005	Hercules, California	3.4
February 3, 2009	Morristown, New Jersey	3.0
January 12, 2010	Port-au-Prince, Haiti	7.0
August 23, 2011	Mineral, Virginia	5.8
August 29, 2011	West Plains, Missouri	2.4
October 16, 2012	Midlothian, Texas	2.7
June 11, 2013	Conway, Arkansas	1.8
October 25, 2013	Fukushima, Japan	7.3
December 24, 2013	Tustin, California	1.3
January 17, 2014	Jacó, Costa Rica	5.2

Name _____ Date _____

Chapter 6 Performance Task (continued)

1. Using the chart, plot and label the earthquake data according to magnitude. The x-axis represents the whole-number portion of the magnitude and the y-axis represents the decimal portion of the magnitude. For example, a quake of magnitude 5.3 occurring in Trinidad, Colorado, would be plotted and labeled as (5, 0.3) because its whole number is 5 and its decimal is 0.3.



2. What earthquake was about 10 times stronger than the quake in Tustin, California?

3. What earthquake was about 100 times stronger than the quake in Fukushima, Japan?

4. What earthquake was about 1000 times stronger than the quake in Jacó, Costa Rica?

5. What is the smallest earthquake in the data? What is the largest? Compare their magnitudes.

6. How much larger was the devastating San Francisco quake than the quake that barely shook Ocotillo Wells, California? Explain.

7. Find two earthquakes, other than the ones in Exercise 2, in which one was about 10 times stronger than the other. Explain how you chose these quakes.

8. Find two earthquakes, other than the ones in Exercise 3, in which one was about 100 times stronger than the other. Explain how you chose these quakes.

9. Find two earthquakes, other than the ones in Exercise 4, in which one was about 1000 times stronger than the other. Explain how you chose these quakes.

10. Find two earthquakes in which one was 10,000 times stronger than the other. Explain how you chose these quakes.

11. Find two earthquakes in which one was a million times stronger than the other. Explain how you chose these quakes.