Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class \_\_\_\_\_\_\_\_\_\_\_\_

**Comparing the Richter and Moment Magnitude Scales**

The Richter scale rates earthquakes based on the size of their seismic waves, as measured by seismographs. The moment magnitude scale rates earthquakes based on the total amount of energy they release. To determine the moment magnitude rating, seismologists measure the surface area of the ruptured fault and how far the land moved along the fault. An earthquake’s Richter rating and moment magnitude rating are not always the same. The table below shows the ratings on both scales for some famous earthquakes.

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Location** | **Magnitude** | |
| **Richter scale** | **Moment magnitude scale** |
| 1811–1812 | New Madrid, midwestern U.S. | 8.7 | 8.1 |
| 1906 | San Francisco, California | 8.3 | 7.8 |
| 1960 | Arauco, Chile | 8.3 | 9.5 |
| 1964 | Anchorage, Alaska | 8.4 | 9.2 |
| 1971 | San Fernando, California | 6.4 | 6.7 |
| 1985 | Mexico City, Mexico | 8.1 | 8.1 |
| 1989 | San Francisco, California | 7.1 | 6.9 |
| 1994 | Northridge, California | 6.4 | 6.7 |
| 1995 | Kobe, Japan | 6.8 | 6.9 |

*Answer the following questions:*

1. Which earthquake was strongest according to the Richter scale?
2. Which was strongest according to the moment magnitude scale?
3. Which earthquakes had the same or close to the same ratings on both scales?
4. Which earthquakes were rated more than 0.5 points stronger on the moment magnitude scale than they were rated on the Richter scale?
5. Which earthquakes were rated more than 0.5 points stronger on the Richter scale than they were rated on the moment magnitude scale?
6. Why can the same earthquake have different ratings on the two scales? Use CER format to answer this question with evidence and reasoning based on the information provided in this document.

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