

**Earthquakes** ▪ *Enrich*

## 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 US	8.7	8.1
1906	San Francisco, California	8.3	7.7
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	7.2
1994	Northridge, California	6.4	6.7
1995	Kobe, Japan	6.8	6.9

*Answer the following questions on a separate sheet of paper.*

1. Which earthquake was strongest according to the Richter scale? Which was strongest according to the moment magnitude scale?
2. Which earthquakes had the same or close to the same ratings on both scales?
3. Which earthquakes were rated more than 0.5 points stronger on the moment magnitude scale than they were rated on the Richter scale?
4. Which earthquakes were rated more than 0.5 points stronger on the Richter scale than they were rated on the moment magnitude scale?
5. Why can the same earthquake have different ratings on the two scales?