Scales that Represent Earthquake Magnitude

Measuring Earthquakes

- Mercalli intensity scale: determined in terms of what nearby residents felt and the damage that was done to nearby structures
- Richter magnitude scale: uses a seismometer to measure the magnitude of the largest jolt of energy released by an earthquake
- Moment magnitude scale: measures the total energy released by an earthquake
    - Calculated from the area of the fault that is ruptured and the distance the ground moved along the fault
- The Richter scale and the moment magnitude scale are **logarithmic scales**
    - The amplitude of the largest wave increases ten times from one integer to the next
    - An increase in one integer means that thirty times more energy was released
    - These two scales often give very similar measurements
- Moment magnitude scale is most preferable
    - More accurately reflects the energy released and the damage caused
    - Most seismologists now use the moment magnitude scale

Study Tip

Practice logarithmic math problems to better understand how the Richter and Moment magnitude scales work.

Concept Check

- Under what circumstances might the Mercalli Intensity Scale be useful today? Why was it replaced by the Richter and then the moment magnitude scales?
- Why do scientists prefer the moment magnitude scale to the Richter scale?
- How much difference is there between the 5.8 magnitude quake that struck Virginia and the 9.0 quake that struck Japan, both in 2011, in their energy released and largest wave amplitude?