# What Does the Number Measuring the Strength of an Earthquake Tell Us?

This Experiment is Provided as a Free Service to Home Educators
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The following experiment from the Backyard Scientist was developed expressly for use in newsletters serving home educators. This experiment is NOT contained in the award-winning *Backyard Scientist* books and science kits. As in the *Backyard Scientist* books, it is designed to be simple, fun, and of course to teach an important scientific concept.

**Introduction.**
This experiment will help students (and some adults) better understand what it means when the newsperson says there was an earthquake of a certain magnitude and the large difference in destructive strength between relatively small numbers. We, here at the Backyard Scientist laboratory in California know all about earthquakes.

**Gather the following supplies:**
hard surface to work on (table)
meter stick (similar to a yard stick about 39 inches long)
pencil
15 meters of adding machine tape
masking tape

**Begin experimenting.**
1. Draw a line across the tape at the left end and mark it ***2.4***.
2. Measure a point 10 millimeters to the right from the 2.4 line and draw line marking it ***3.4***.
3. To the right of the 3.4 line, measure 100 millimeters or 10 centimeters (they are the same distance in metric measurement) and draw a line marking the line ***4.4***.
4. To the right of the 4.4 line, measure 1000 millimeters or 100 centimeters or 1 meter (they are the same length in metric measurement) and draw a line marking it ***5.4***.
5. Lastly, measure 10 meters to the right of the 4.4 line and label it ***6.4***.

6. Stretch your tape out on the floor, taping each end down with masking tape.
7. Observe the increasing distances between marks on the tape.

**Can you answer the following questions based on your observations?**

1. How much stronger is a 3.4 earthquake than a 2.4 earthquake?
2. How much stronger is a 4.4 earthquake than a 2.4 earthquake?
3. How much stronger is a 5.4 earthquake than a 2.4 earthquake?

**Backyard Scientist explanation to the experiment.**

Earthquakes are measured using the internationally recognized Richter scale. This means that scientists around the world know the relative destructive forces of earthquakes produced when the earth moves along the many fault lines around the world.

The Richter scale is based on multiples of ten. A 6.4 earthquake is 10 times stronger than a 5.4, 100 times (10 x 10) than a 4.4 earthquake, 1000 (10 x 10 x 10 x 10) times stronger than a 2.4 earthquake.

The famous 1906 San Francisco earthquake measured 8.3 on the Richter scale and the most recent earthquake in Peru measured 8.0 on the Richter scale.

Here are common effects of earthquakes of various magnitudes:

2.4 hanging plants may swing
dishes, windows and doors rattle similar to when a large truck passes nearby

5.4 walls crack, weak walls may fall and people have difficulty standing

6.4 buildings may collapse, underground pipes may break and large cracks appear in the ground

In earthquake zones, modern buildings are designed to withstand the effects of strong earthquakes and tall buildings are prohibited right next to earthquake faults when they are known. In Los Angeles an earthquake fault was not discovered until after a high rise building was constructed and occupied for many years. One side of the building is one side of the fault and the side of the building is on the other side of the fault. Fortunately, this in not now an active fault.



**About the author.** Jane Hoffman, the Backyard Scientist, is the internationally known author of the award-winning *Backyard Scientist* hands on science books and science kits. The nine science books and three kits will excite, motivate and instruct any student. Also available from the Backyard Scientist is the "Parent Guide to Teaching Science." This work covering grades K –12 helps parents insure they are teaching the science subjects and materials their students should be learning by grade level. Her newest book, *A Science Wonderland for the Very Young* targets children ages 2-7 years. In addition to writing and developing these exciting materials, Jane is a sought-after speaker at Home School and other educational conferences nationwide where she makes science come alive. Everyone leaves her sessions better informed as well as motivated and enthused to apply the concepts they learned. Hoffman's teacher inservice workshops for teachers are rated the best available by teachers and administrators. She has been serving the homeschool and educational markets with quality materials nearly 25 years. For a free brochure, send a self-addressed, stamped ($.60) envelope to: Backyard Scientist, PO Box 16966, Irvine, CA 92623 or visit her on the Worldwide Web at: www.backyardscientist.com