



## SfS Away from the Classroom!

### ES15: Seismic Waves (Recommended for Grades 6-8)

Please use the following resources to learn about seismic waves and how scientists measure them.

Watch this Video: [PBS NOVA video on Earthquakes and Seismographs](#)

#### Answer these questions:

- What are the two types of seismic waves produced by an earthquake?
- How does a seismograph record seismic waves?
- How is the magnitude of an earthquake determined?
- How many times more energy is released in an earthquake of magnitude 7 than in one of magnitude 6?

**Activities:** Follow these instructions to record your own seismograph trace as you ride in a car.

You will need:

<ul style="list-style-type: none"><li>• Pad of lined paper</li><li>• Fine tip marker</li></ul>	<ul style="list-style-type: none"><li>• A car, a driver, and a bumpy road</li></ul>	<ul style="list-style-type: none"><li>• Ruler (with cm measurements)</li></ul>
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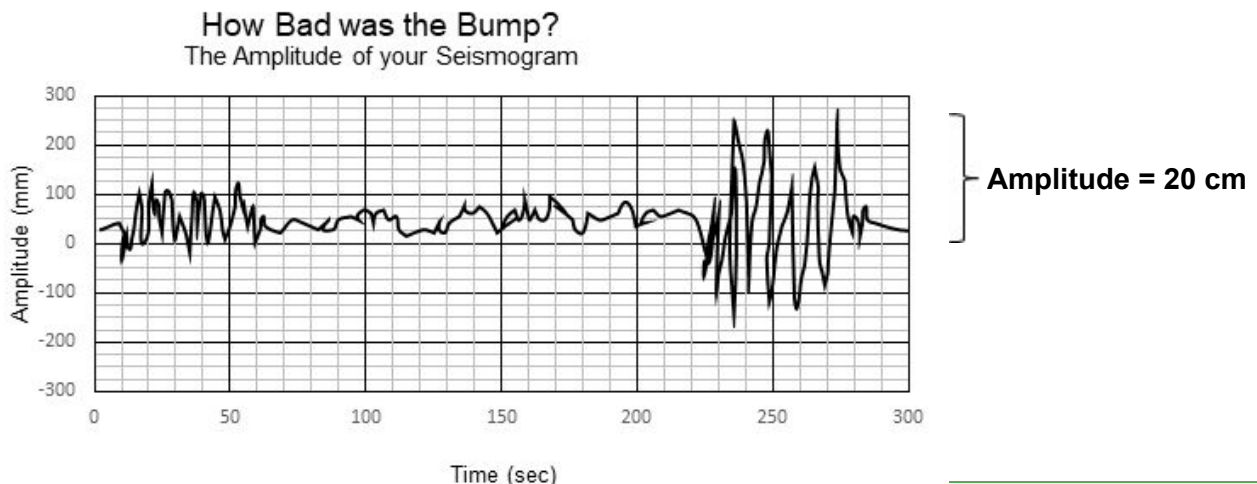
In the following activity, you are going to create your own seismograms, and then use the Richter scale to measure the magnitude of the bumps you hit while driving along the road.

#### Record the seismogram (while you're on the road)

1. While riding as a passenger, hold the pad of paper vertically against the dashboard or seat in front of you.
2. Hold the marker in your other hand and slowly trace a line from left to right across the paper.
3. Your hand is tracing seismogram-like recordings, going up and down every time you hit a bump.
4. Repeat this for as many seismograms as you want to make.

\*(You can also do this while sitting on a scooter or wagon and someone pushes you along a driveway or sidewalk).

Example seismogram:



**Measure** the magnitude of the seismic wave (when you're back home). The magnitude of an earthquake can be determined by measuring the **amplitude** of the highest seismic wave. The Richter scale that describes the magnitude of an earthquake is *logarithmic*, which means that a 6.0 magnitude earthquake is ten times stronger than a 5.0 and one hundred times stronger than a 4.0.

5. Measure the maximum amplitude, in cm, for each of your seismograms.
6. You should use the table below to convert the measurement into a magnitude.

Amplitude		Magnitude
cm	mm	
0.01	0.1	2.00
0.1	1	3.00
1	10	4.00
2	20	4.30
4	40	4.60
8	80	4.90
10	100	5.00

How do the bumps on your road compare to real earthquakes? Maybe you hit a deep pothole that bumped your hand up 4 cm, which is a magnitude of 4.6. The earthquake in Haiti on January 10, 2010 had a magnitude of 7.0. If you hit a pothole with a 7.0 magnitude, the bump would move your hand 1,000 cm. That's 10 meters!

Watch this video for help setting up the activity: [ES15 Seismic Waves.mp4](#)

### **Make observations & use Claims, Evidence, and Reasoning!**

1. **Claim:** Riding on a bumpy road is as much shaking as a mild earthquake.

- **Evidence:**

- **Reasoning:**

2. **Claim:** Each seismograph shows the measurement of how much things move in one direction.

- **Evidence:**

- **Reasoning:**