

# Measuring Wave Properties: Wavelength, Amplitude, and Frequency

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## LEARNING OBJECTIVE

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The student will measure and calculate wavelength, amplitude, and frequency using a hands-on rope wave.

## MATERIALS NEEDED

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- a rope or long jump rope
- a stopwatch or phone timer
- ruler or measuring tape
- paper
- pencil

## HANDS-ON ACTIVITY

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1. With a family member holding (or tying) one end of the rope, shake the free end steadily to produce a continuous, even wave pattern.
2. While a partner holds the rope still at its highest amplitude point (or you sketch it from memory immediately after), measure the height of one crest above the resting (middle) position with a ruler — this is the amplitude.
3. Measure the horizontal distance from one crest to the next crest along the rope — this is the wavelength.
4. Time yourself shaking the rope for 10 seconds while counting the number of complete waves (crest-to-crest cycles) you produce, then divide that count by 10 to calculate frequency in waves per second (Hz).
5. Record all 3 measurements (amplitude, wavelength, frequency) in a labeled data table.

## QUESTIONS

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1. What amplitude did you measure, and what does amplitude tell you about a wave?
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2. What wavelength did you measure, and how is wavelength defined?
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**3. If you counted 8 complete waves in 10 seconds, what is the frequency in Hz?**

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**4. What did you notice about the wavelength when you shook the rope faster (higher frequency)?**

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