MAKE A WAVE

INTRODUCTION

In Make a Wave, a slinky and a student wave (wave in a stadium crowd) are used to explore the concepts of waves, frequency, and pitch.

MATERIALS

For Make a Wave, all you need is a slinky, either metal or plastic. If you have a slinky for each group, it might be more engaging.

STANDARDS

NGSS 4 PS4-1
Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.

NGSS 4 PS4-3
Generate and compare multiple solutions that use patterns to transfer information.

NGSS MS PS4-1
Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.

NGSS MS PS4-2
Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

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Students need to develop a conceptual model of waves that becomes more quantitative as they reach middle school. This activity lays the basis for that mental model. It uses physical models to explain how waves work. They will observe physical models of both transverse and compression waves, and see how wavelength, amplitude, frequency, and energy vary. Students will engage in the Science and Engineering Practices of Developing and Using Models, and Using Mathematics and Computational Thinking in this activity. They will also have the opportunity to engage with the Crosscutting Concepts of Patterns, and Cause and Effect. If this is an early introduction to the concepts of wavelength, amplitude, and frequency, you may want to run this activity a little more slowly, drawing the observation of those features of the waves out more explicitly before collecting student responses to the activity. If this is more of a review, you could instead focus on the quantitative relationship between the features. One good way to use the questions is to structure a conversation about the phenomena students are observing around them.

NAME: DATE:

MAKE A WAVE

Draw a diagram of the slinky set up.

Draw a diagram of the slinky making a compression wave
(label wavelength and other important parts of the wave)

Draw a diagram of the slinky making a transverse wave
(label wavelength and other important parts of the wave)

Now your whole class will model a wave.
Draw a diagram of the class wave:

What are some important ways that light and sound waves differ? How are they the same?