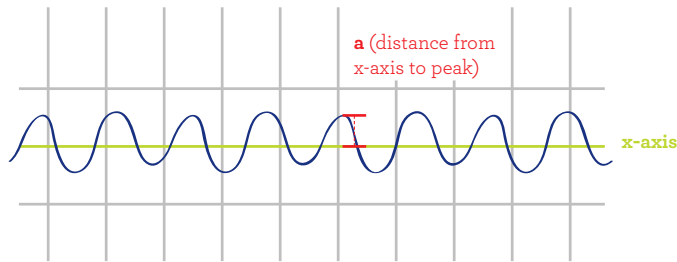


Directions: Read the information below.

Amplitude of Sound

Sound is something we hear, but have you ever thought about how we are able to hear it? Sound is actually a pattern of vibrations that pass from a source, through the air and to our ears. Once it reaches our ears, our brains interpret the pattern of vibrations as noise, words, or music. In conversations, we then become the source of vibration patterns as we speak to our friend. Believe it or not, sound can actually be seen. This doesn't mean watching a person talk; it means we can actually observe the physical vibrations through the air using a tool called an oscilloscope.

If you view sound through an oscilloscope, you may see an image similar to what is pictured below:



These waves may look simple, but they give us a lot of information. We will focus on learning about the amplitude, which is denoted using the letter a . This essentially determines the volume of a sound. Amplitude is the height of the top half of the wave (which, in a repeating pattern, is also equal to the bottom half of the wave). Look at the x-axis above. The highest points of the waves are called peaks whereas the lowest points are called troughs. The distance from the x-axis to the peak is the amplitude. A greater amplitude means a louder noise.

One common mistake students make is believing that amplitude is the distance from the peak to the lowest point on the wave. This is not how amplitude is measured. In fact, if you used the top portion of the wave (say, 1 for example) with the matching bottom portion of the wave (which would be -1) both sides would cancel out and equal 0. This can't be possible because a measurement of 0 amplitude is silence. Make sure you always use one half of the wave, measuring only the distance from the x-axis to the peak.

Directions: Answer the questions below.

1. An amplifier is often used at concerts to help the whole audience hear the music. Specifically, how do you think an amplifier modifies the sound waves?
2. Draw a picture of a sound wave with a low amplitude.
3. Draw a picture of a sound wave with a high amplitude.
4. On each drawing, circle the portion that is the measurement of amplitude.

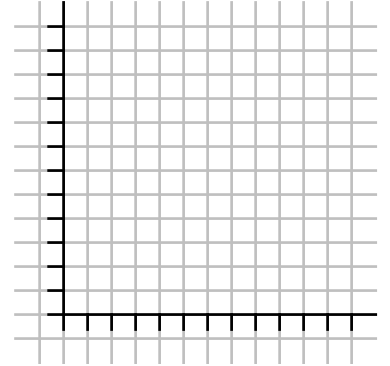
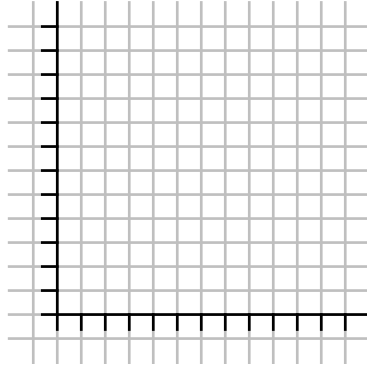
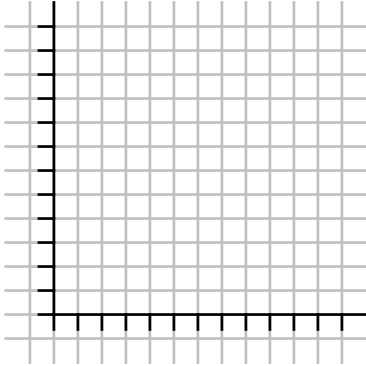
Directions: As your class performs the experiment, record the results and your observations below.

Use the graphs below to draw what your yarn line looked like in each condition. Be sure to label the measurements of height.

Low Energy:

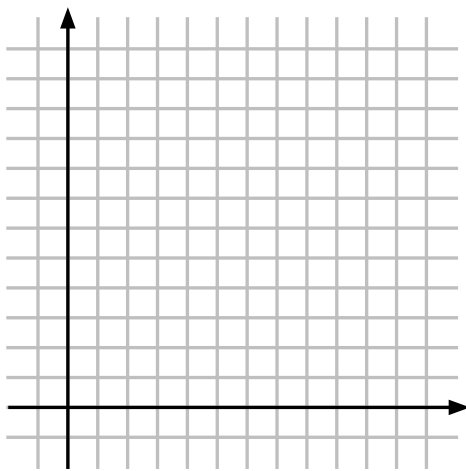
Medium Energy:

High Energy:



	Low Energy	Medium Energy	High Energy
Amplitude			

Plot the level of energy on a scatterplot below, then, draw a line of best fit.



What do you notice about the relationship between energy and amplitude?