**FUN WITH SPRINGS!!**

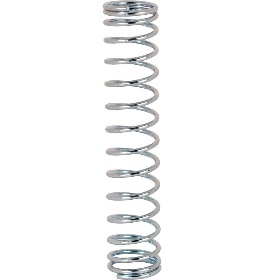
**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade: \_\_\_\_\_\_ / 10**

The function of a wave (or wave pulse) is to transfer energy from one location to another without the transfer of matter.

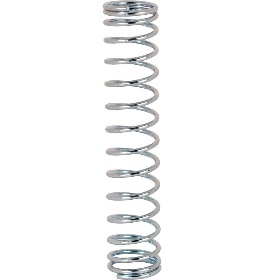
Take turns playing with the springs to answer the following questions about waves.

1. Transverse waves:

a) Send a wave pulse down the spring to your partner such that the coils of the spring move perpendicular to the spine of the spring. Jerk the end of the spring to the side once to send a single wave pulse. Watch how the wave travels down the spring. Draw an arrow representing the direction of the wave motion.

[](https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&ved=0ahUKEwj01p-O39fWAhVL2IMKHZaKC94QjRwIBw&url=https%3A%2F%2Fwww.amazon.com%2FPrime-Line-Products-SP-9713-Compression%2Fdp%2FB008RG80Y2&psig=AOvVaw0Fe0xXg16K__wE22TvS-iK&ust=1507233129276150)

Draw another arrow representing the direction each individual coil of the spring moves.

[](https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&ved=0ahUKEwj01p-O39fWAhVL2IMKHZaKC94QjRwIBw&url=https%3A%2F%2Fwww.amazon.com%2FPrime-Line-Products-SP-9713-Compression%2Fdp%2FB008RG80Y2&psig=AOvVaw0Fe0xXg16K__wE22TvS-iK&ust=1507233129276150)

b) Now move one end of the spring in a *random* frequency oscillation. Describe the motion.

Adjust the frequency of your oscillation until you get large amplitudes with one loop, two loops, three loops…. Sketch the motions.

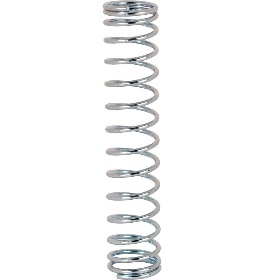
Do you notice any relationship between the frequencies needed for one loop to two loops to three loops, etc…?

Explain why these are called standing waves.

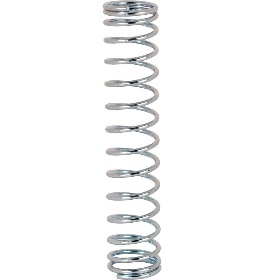
While in a standing wave motion, focus on a single coil of the spring and describe its motion.

2. Longitudinal waves:

a) Send a wave pulse down the spring such that the coils of the spring move parallel to the motion of the wave energy. Keep the spring straight and push or pull the end of the spring quickly to send a wave pulse down the spring. Draw an arrow representing the direction of the wave motion.

[](https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&ved=0ahUKEwj01p-O39fWAhVL2IMKHZaKC94QjRwIBw&url=https%3A%2F%2Fwww.amazon.com%2FPrime-Line-Products-SP-9713-Compression%2Fdp%2FB008RG80Y2&psig=AOvVaw0Fe0xXg16K__wE22TvS-iK&ust=1507233129276150)

Draw another arrow representing the direction each individual coil of the spring moves.

[](https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&ved=0ahUKEwj01p-O39fWAhVL2IMKHZaKC94QjRwIBw&url=https%3A%2F%2Fwww.amazon.com%2FPrime-Line-Products-SP-9713-Compression%2Fdp%2FB008RG80Y2&psig=AOvVaw0Fe0xXg16K__wE22TvS-iK&ust=1507233129276150)

b) Is it possible to create standing waves with longitudinal waves? Try it.

3. What qualitative evidence do you have indicating energy was transmitted from one end of the spring to the other for a transverse wave?

…for a longitudinal wave?

4. How fast did the wave pulse move as a transverse wave? Estimate based on distance traveled and time required. Perform whatever measurements you need.

…for a longitudinal wave?

Which moves faster, transverse or longitudinal? Or do they travel at roughly the same speed?