Waves

Experiment Part 1: Waves in a Slinky

What You'll Need:

- A slinky
- A friend, sibling, or a parent to help you hold the other end of the slinky

What You'll Do:

1. For this experiment, you'll be using a slinky to demonstrate longitudinal waves. To start, take your slinky and stretch it out, with each person holding one end of the slinky. The other person should not move or wiggle the slinky.

2. Quickly push your end of the slinky just a few inches toward the person holding the other end of the slinky and then bring it back to the original length in a fraction of a second. This will create a wave that will travel down the slinky.

3. Keep making waves in the slinky. Pay attention to the direction you had to move the slinky to make the wave. This is the direction of disturbance. Watch the wave move across the slinky and use your observations to answer questions 1 and 2 on your "What You Discovered" worksheet.

4. Next, try stretching the slinky out more. Make some waves. Try pulling the slinky closer together and making more waves. Experiment with the slinky waves at different lengths and then use your observations to answer question 3 on your "What You Discovered" worksheet.

5. Draw a picture of your slinky wave for question 4 on your "What You Discovered" worksheet.

What Does It Mean?

Waves are a way that energy can travel through space. They are a periodic disturbance in a substance that travels through that substance. In this experiment, a periodic disturbance in the slinky happened when you flicked your wrist, creating a wave. This disturbance in the slinky was in the same direction as the direction the wave traveled in the slinky, so it was a longitudinal wave, one of two types of waves scientists study. Sound waves are an example of longitudinal waves, meaning they are a lot like waves in a slinky. The air in a sound wave moves back and forth in the same direction that the sound wave is traveling.

Check out the dōTERRA® Science for Kids unit on Sound to learn more about how sound waves work.

Experiment Part 2: Waves on a String

What You'll Need:

- About 6 feet of string
- A friend, sibling, or a parent to help you hold the other end of the string

What You'll Do:

1. For this experiment, you will be using string to demonstrate transverse waves. To start, take your string and stretch it out, with each person holding one end of the string. Make sure the string is loose and held slightly above the ground so that you can move it to make a wave. The other person should not move or wiggle the string.

2. Use a quick flick of the wrist to lift up your end of the string and then bring it back to the original height in a fraction of a second. This will create a wave that will travel down the string.

3. Keep making waves in the string. Pay attention to the direction you had to move the string to make the wave. This is the direction of disturbance. Watch the wave move across the string. Is the wave moving in the same direction as you had to move to make the disturbance?

4. Use your observations to finish your "What You Discovered" worksheet.

What Does It Mean?

A transverse wave is a wave in which the direction of the disturbance and the direction of the wave are in two different directions. String waves, water waves, and light waves are all known as transverse waves. In your experiment with the string, the string moved up and down to make a wave, but the wave moved across the string. In water waves, the water moves up and down, but the wave moves across the surface of water. In light waves, the light travels straight away from the source, but the wave wiggles up and down and side to side in other directions. Transverse waves are everywhere!

What to Do Next:

- Revisit the Science for Kids tab on the dōTERRA® Science Blog for more fun science experiments and activities, including a unit on Sound.
- With the permission of a responsible adult, share pictures of your slinky and string waves on social media using the hashtags, **#doterrascienceforkids** and **#featureme** for a chance to be featured on the dōTERRA Science Facebook page.

What You Discovered:

1. What direction did you move the slinky to create the disturbance? In what direction was the slinky wave moving? Are they the same?

2. Are slinky waves transverse waves or longitudinal waves?

3. Do the waves move faster when the slinky is stretched or when it is loose?

4. Draw a picture of your slinky wave.

5. Is the string wave moving in the same direction as you had to move it to make the disturbance?

6. Are string waves transverse waves or longitudinal waves?

7. Draw a picture of your string wave.