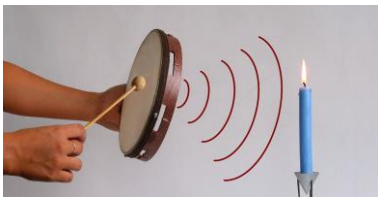
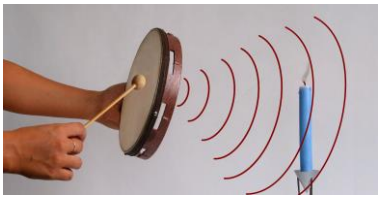
Sound propagation

The following experiment illustrates how sound waves propagate. The experiment can easily be carried out in the classroom. The objective is to blow out a candle using a tambourine. All that is required is a lit candle and a tambourine.

Description of the experiment

The following images show what happens if the tambourine is struck:

	The tambourine is struck at a short distance from the lit candle.
	When the skin of the tambourine is struck, the air directly behind the taut skin gets slightly compressed. To make way for this overpressure, the air particles will move forward, hitting other air particles in turn. This means a lot of small pulses are transmitted from one particle to another, resulting in a continuous shock wave moving towards the candle.
	As soon as the shock wave hits the candle, the pulse is transmitted, blowing out the candle.

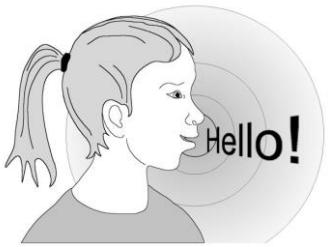
Naturally, the shock wave propagates into other directions as well; otherwise, you could only hear the sound if you were right in front of the tambourine.

Alternative experiment

A lit candle can also be blown out by hitting a base drum.

Analogy: Sound propagation when speaking

Sound waves are also created when speaking. They are generated by the vocal chords; they propagate in a spherical fashion, and the carrier medium is air. The sound lets the air molecules vibrate evenly; these vibrations are then transmitted to adjacent molecules.



The result is a spherical propagation of the sound waves. Because the sound energy is transmitted between adjacent molecules, it diminishes the further it moves away from its source, and the volume of the sound signal will continue to decrease until it can no longer be heard.